



# Service Manual

## Nakamichi BX-150 BX-150E

2 Head Cassette Deck



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## 1. GENERAL

### 1.1. Voltage Selector

Voltage selector is installed on the rear panel for Other version of the Nakamichi BX-150. This voltage selector can select either 120 V or 220-240 V at customer's disposal.

### 1.2. Packing Materials and Owner's Manual

Part No.	Description	Q'ty
0F03738A	Carton Box BX-150 (Silver)	1
0F03739A	Carton Box BX-150 (Black)	1
0F03752A	Carton Box BX-150E (Silver)	1
0F03753A	Carton Box BX-150E (Black)	1
0F03674B	Packing	2
0D04313A	Owner's Manual (BX-150 (U.S.A., Canada & Australia) & BX-150E (UK))	1
0D04314A	Owner's Manual (BX-150 (Japan))	1
0D04318A	Owner's Manual (BX-150 (Others) & BX-150E (220V Class 2))	1

### 1.3. Serial Number

The BX-150 has two versions, Silver and Black.

In the service manual, serial numbers of these versions are identified as follows:

Silver version: A320xxxxx

Black version: A321xxxxx

However, the actual serial number on the serial number plate of the BX-150 is indicated as A320.1xxxxx. The serial number begins with A320.101001.

## 2. MECHANICAL ADJUSTMENTS

### 2.1. Tape Guide Height Check for Record/Playback Head and Erase Head

With use of an M-300 produced by Information Terminals, tape guide height check for the Record/Playback and Erase Heads shall be made, wherein a small block shall be pushed straight down to the base while in use of the M-300. Refer to Fig. 2.1.

#### (1) Record/Playback Head Tape Guide Height

- (a) Load the base of the M-300 carefully, then set the cassette deck in Play mode.
- (b) Place the small block of the M-300 on the base.
- (c) Slide the small block against the tape guide of the Record/Playback Head, and check to insure that the block is accepted by the tape guide.
- (d) If not, loosen the screw and insert a shim (either 30  $\mu$ m (OC80048A), 60  $\mu$ m (OC80038A), or 100  $\mu$ m (OC80039A)) to raise the Record/Playback Head, then tighten and apply a quantity of lock tight paint to the screw.

#### (2) Erase Head Tape Guide Height

- (a) Load the base of the M-300 carefully, then set the cassette deck in Play mode.
- (b) Place the small block of the M-300 on the base.
- (c) Slide the small block against the tape guide of the Erase Head, and check whether the block is accepted by the tape guide.

### 2.2. Head Base Stroke Check

Refer to Fig. 2.2.

- (1) Load the base of the M-300 carefully, then push the base toward the Record/Playback Head to eliminate the clearance between the reference pin and the base.
- (2) Set the cassette deck in Play mode.
- (3) Place the small block of the M-300 on the base.
- (4) Contact the small block with the Record/Playback Head surface and the Erase Head surface, and check whether the end of the small block is located within the specified tolerance as shown in the figure.

### 2.3. Record/Playback Azimuth Alignment and Height Check

Refer to Fig. 2.1.

- (1) Connect a VTVM to the Output Jacks.
- (2) Load a 15 kHz Azimuth Tape (DA09004B), then set the cassette deck in Play mode.
- (3) Turn the Azimuth Alignment Screw until the outputs of both channels become maximum.
- (4) Load a 1 kHz Track Alignment Tape (DA09007B), then set the cassette deck in Play mode.
- (5) Check to insure that the readings of both channels on the VTVM are below -25 dB.  
If not, replacement of the Record/Playback Head will be required.
- (6) Apply a quantity of lock tight paint to the Azimuth Alignment Screw.

### 2.4. Pressure Adjustment of Pressure Roller

Refer to Fig. 2.3.

- (1) In Play mode, measure the torque of the Pressure Roller and check whether the torque is in a range of  $320 \pm 50$  g-cm.
- (2) If torque is out of the range, correct it by changing the installation point of the Pressure Roller Spring.

### 2.5. Tape Travelling Check

Load the Tape Travelling Cassette (DA09027B), then set the cassette deck in Play mode and check the following:

- (1) After more than 2 seconds, the fluctuation of the tape travelling on the Record/Playback Head is small.
- (2) Tape is in contact with the head sufficiently.
- (3) Tape waving is small on the heads and pressure roller.

### 2.6. Eject Damper Adjustment

Refer to Fig. 2.4. Load a cassette tape, and with opening the Cassette Case by pressing the Eject button and closing it by hand, adjust the speed of damper movement by the Adjustment Screw.

- CCW: Damper moves fast.  
CW: Damper moves slowly.

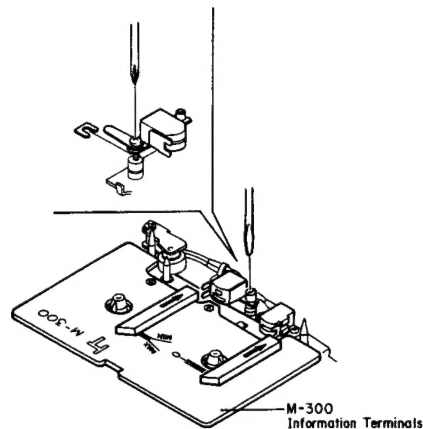


Fig. 2.1

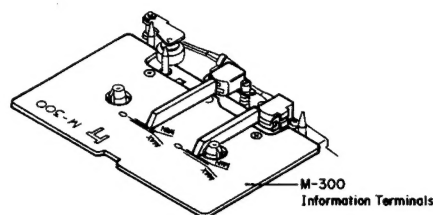


Fig. 2.2

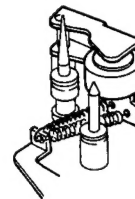


Fig. 2.3

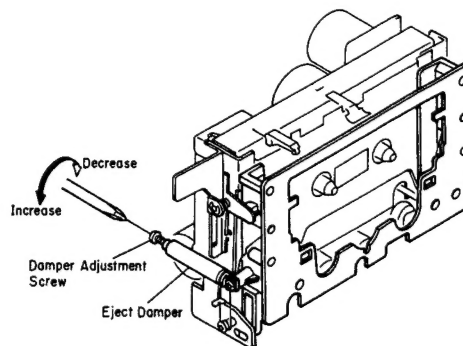


Fig. 2.4

### 2.7. Reel Motor Speed Adjustment in Play Mode

- (1) To warm-up the cassette deck, load a C-60 cassette tape and set the cassette deck in Play mode.
- (2) After more than four minutes, load a torque meter TW-211 (made by Sony) and set the cassette deck in Play mode.
- (3) Adjust VR601 on the Main P.C.B. Ass'y to obtain exactly 50 g-cm on the torque meter.

### 2.8. Tape Speed Adjustment

Refer to Fig. 2.5.

- (1) Connect a frequency counter to the Output Jacks.
- (2) Load a 3 kHz Speed and Wow/Flutter Tape (DA09006C) and Play it back.
- (3) Adjust the Tape Speed Adjustment Volume incorporated in the Capstan Motor to obtain 3,000 Hz on the frequency counter.

CCW: Motor drives slowly.

CW: Motor drives fast.

### 2.9. Lubrication

The tape transport is of a lubrication-free type mechanism. When the following parts are replaced, apply the specified lubricant.

- (1) Molykote (R) Grease (X5-6020)  
Cam Motor Pulley  
Thrust portion on the Capstan Shaft
- (2) FLOIL GB-TS-1  
Washer between Reel Hub Ass'y and Back Tension Spring
- (3) Diamond Oil (EP56)  
Reel Hub Shaft
- (4) Anderol 456  
Capstan Shaft

Note: We suggest that you use the above specified lubricant or equivalent type.

The company dealing in the above lubricant is as follows:

- (a) Molykote (R) Grease (X5-6020)  
Dowcorning Co., Ltd., 1-15-1 Nishishinbashi, Minato-ku, Tokyo, Japan
- (b) FLOIL GB-TS-1  
Kanto Chemicals Co., Ltd., 2-7 Kanda Sakuma-cho, Chiyoda-ku, Tokyo, Japan
- (c) Diamond Oil (EP-56)  
Mitsubishi Oil Co., Ltd., 1-2-4 Toranomom, Minato-ku, Tokyo, Japan
- (d) Anderol 456  
Toyo Kokusai Oil Co., Ltd., 3-3-5 Hatchobori, Chuo-ku, Tokyo, Japan

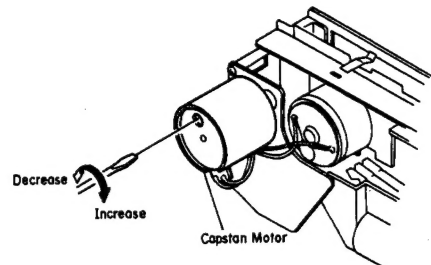


Fig. 2.5



### 3. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

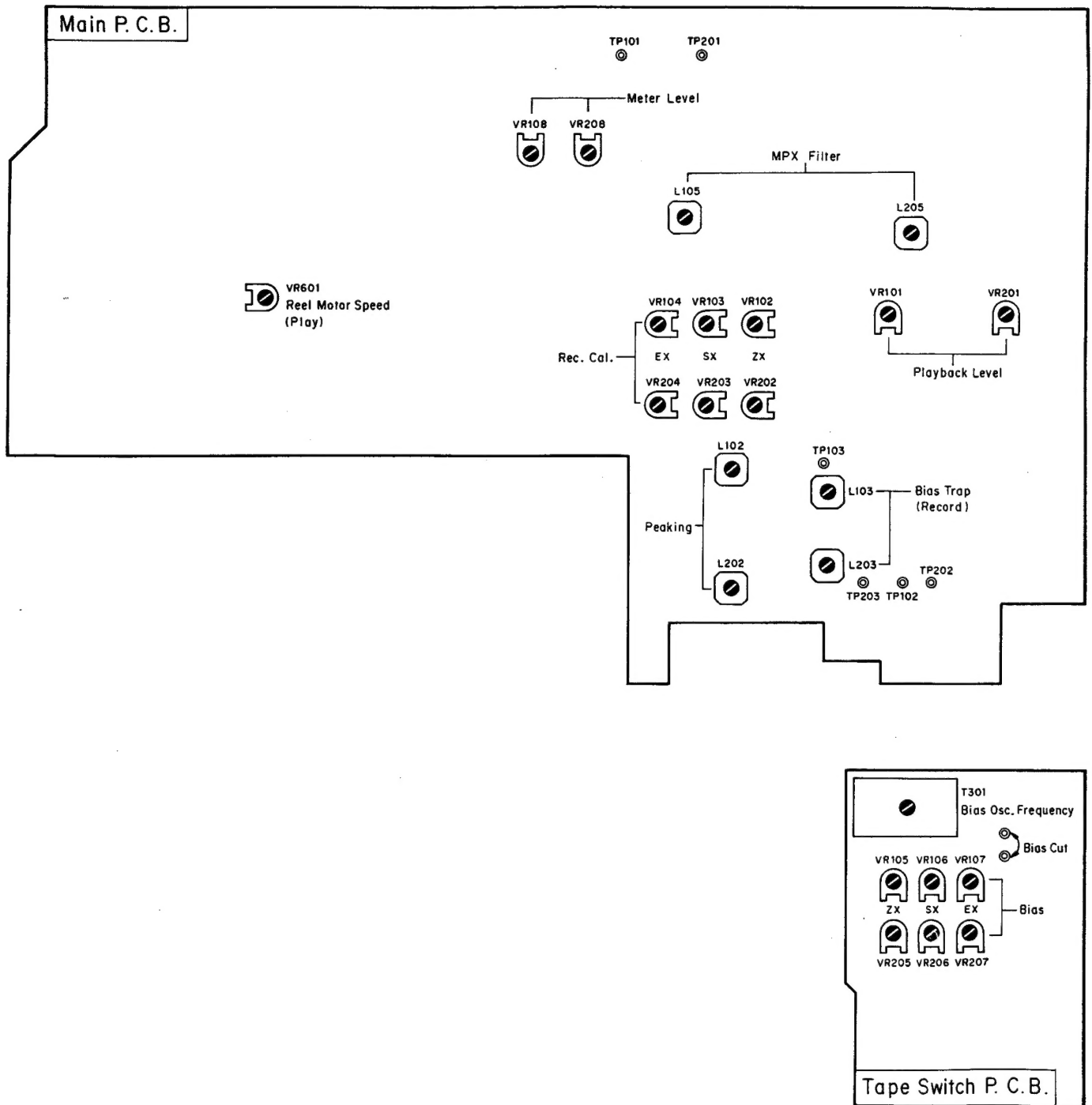


Fig. 3

#### 4. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Note: Electrical adjustment should be performed after mechanical adjustment is completed.

##### 4.1. Adjustment and Measurement Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Frequency Counter to Output Jacks	Playback Eq. SW — 70 $\mu$ s	Tape Speed Adjustment Volume	Adjust the volume incorporated in the capstan motor to obtain 3 kHz $\pm$ 0.5% on the frequency counter.
2	Meter Level Calibration	400 Hz to Input Jacks	VTVM to TP101, TP201 on Main P.C.B.	Record, Pause	Main P.C.B. VR108,VR208	<ol style="list-style-type: none"> <li>1. Feed in 400 Hz, then adjust the Input Level control to obtain 350 mV <math>-0.8</math> dB on the VTVM.</li> <li>2. Adjust VR108 (VR208) so that the 0 dB segment of the level meter starts illuminating.</li> <li>3. Adjust the Input Level control to obtain 350 mV on the VTVM, then decrease the generator output level by 20 dB.</li> <li>4. Check to insure that the segment for <math>-20</math> dB illuminates.</li> </ol>
3	MPX Filter Adjustment	19 kHz $\pm$ 100 Hz to Input Jacks	VTVM to Output Jacks	Record, Pause MPX SW — OFF/ON	Main P.C.B. L105,L205	<ol style="list-style-type: none"> <li>1. Adjust the Input Level control to obtain 0 dB (500 mV) on the VTVM.</li> <li>2. Set the MPX Filter switch to ON, then adjust L105 (L205) to obtain minimum reading on the VTVM (minimum reading will be less than <math>-30</math> dB).</li> </ol>
4	Record/Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004B)	VTVM to Output Jacks	Playback Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	Record/Playback Head Azimuth Alignment Screw	Adjust the Record/Playback Head Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM.
5	Playback Level Calibration	400 Hz Level Tape (DA09005B)	VTVM to TP101, TP201 on Main P.C.B.	Same as above	Main P.C.B. VR101,VR201	Adjust VR101 (VR201) to obtain 350 mV on the VTVM.
6	Playback Frequency Response Adjustment	400 Hz Level Tape (DA09005B) 10 kHz PB Frequency Response Tape (DA09003B) 15 kHz PB Frequency Response Tape (DA09002B) 20 kHz PB Frequency Response Tape (DA09001B)	VTVM to Output Jacks	Playback Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. R110,R210 R195,R295	<ol style="list-style-type: none"> <li>1. Load a 400 Hz level tape and play it back.</li> <li>2. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the record/playback head azimuth to obtain maximum levels on the VTVM with each tape.</li> <li>3. Read the maximum levels with each tape and check to insure that the levels against the 400 Hz level tape are within the following ranges. If not, short R110 (R210) or R195 (R295) on the Main P.C.B. Ass'y to obtain satisfactory results.  <ul style="list-style-type: none"> <li>10 kHz (<math>-20</math> dB) <math>-2</math> dB to <math>+2</math> dB</li> <li>15 kHz (<math>-20</math> dB) <math>-2</math> dB to <math>+3</math> dB</li> <li>20 kHz (<math>-20</math> dB) <math>-2</math> dB to <math>+4</math> dB</li> </ul> </li> <li>4. Check to insure that the difference in level between 10 kHz (<math>-20</math> dB) and 20 kHz (<math>-20</math> dB) is less than 2 dB.</li> <li>5. Refer to the "Playback Frequency Response Adjustment" in item 4.2 for the detailed description.</li> <li>6. Conduct step 4 "Record/Playback Head Azimuth Alignment".</li> </ol>
7	Bias Oscillation Frequency and Erase Current Adjustment		Frequency Counter to TP102 on Main P.C.B. and VTVM across the additional 0.1 $\Omega$ resistor	Record, Pause Tape SW — ZX Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. T301 R318,R350	<ol style="list-style-type: none"> <li>1. Adjust T301 to obtain 105 kHz on the frequency counter.</li> <li>2. Connect an additional 0.1 <math>\Omega</math> resistor in series to the Erase Head, then connect a VTVM across it.</li> <li>3. Check the erase current by the VTVM. Erase current will be in a range of 145 mA to 185 mA (typically approx. 165 mA). If erase current is not sufficient, increase it by shorting R318 or R350.</li> <li>4. After completion of the erase current adjustment, re-check the bias oscillation frequency.</li> <li>5. Remove the additional 0.1 <math>\Omega</math> resistor.</li> </ol>
8	Record Amplifier Equalizer Adjustment	21 kHz ( $-20$ dB) to Input Jacks	VTVM to TP102, TP202 on Main P.C.B.	Same as above	Main P.C.B. L102,L202	<ol style="list-style-type: none"> <li>1. Short both Bias Stop test pins with a clip to stop the bias oscillation.</li> <li>2. Adjust L102 (L202) to obtain peak reading at 21 kHz on the VTVM.</li> <li>3. Remove the clip from the test pins.</li> </ol>
9	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TP103, TP203 on Main P.C.B.	Same as above	Main P.C.B. L103,L203	Adjust L103 (L203) to obtain maximum reading on the VTVM.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
10	Record Level Calibration and Recording Bias Current Adjustment	400 Hz (0 dB), 400 Hz (-20 dB), 10 kHz (-20 dB) and 17 kHz (-20 dB) to Input Jacks	VTVM to TP101, TP201 and TP102, TP202 on Main P.C.B. and VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 $\mu$ s (ZX/SX) 120 $\mu$ s (EX) Dolby NR SW — C-Type/B-Type/ OFF MPX SW — OFF	Main P.C.B. (Level) ZX: VR102,VR202 SX: VR103,VR203 EX: VR104,VR204 (Bias) ZX: VR105,VR205 SX: VR106,VR206 EX: VR107,VR207	Adjustment should be made in the order of ZX, SX and EX.  1. Set the Dolby NR switch to C-Type. 2. Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y. 3. Set the BX-150 in Record/Pause mode. 4. Feed in 400 Hz, then adjust the Input Level control to obtain 350 mV (0 dB) on the VTVM. 5. Load a reference ZX tape (DA09037B), reference SX tape (DA09025B) and reference EXII tape (DA09066B). 6. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EXII to center positions. 7. Connect the VTVM to TP102 (TP202) on the Main P.C.B. Ass'y. Adjust Bias VR105 (VR205) for ZX, VR106 (VR206) for SX and VR107 (VR207) for EXII to obtain the following bias current in Record/Pause mode (the VTVM is connected across a 10-ohm resistor). ZX: approx. 1 mA SX: approx. 0.5 mA EXII: approx. 0.3 mA 8. Connect the VTVM to the Output Jacks. 9. Feed in 400 Hz (-20 dB) and 17 kHz (-20 dB), then record, rewind and play them back. Adjust Bias VR105 (VR205) for ZX, VR106 (VR206) for SX and VR107 (VR207) for EXII to obtain the same playback levels at 400 Hz (-20 dB) and 17 kHz (-20 dB) on the VTVM. 10. Feed in 400 Hz (0 dB), then record, rewind and play it back. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EXII to obtain 0 dB on the VTVM. 11. Repeat above 9 and 10 two or three times to obtain optimum performance. 12. Set the Dolby NR switch to OFF. 13. Feed in 400 Hz (-20 dB), 10 kHz (-20 dB) and 17 kHz (-20 dB), then record, rewind and play them back. Check to insure that the playback levels are within -20 dB $\pm$ 3 dB against the levels in Dolby NR C-Type. 14. Set the Dolby NR switch to B-Type. 15. Feed in 10 kHz (-20 dB) and 17 kHz (-20 dB), then record, rewind and play them back. Check to insure that the levels are within -20 dB $\pm$ 2 dB against the levels in Dolby NR OFF. 16. Check to insure whether the total harmonic distortion is less than 1.0% for ZX and EXII tapes and 1.2% for SX tape. 17. If above is not sufficient, repeat 9 to 16 till satisfactory results are obtained.
11	Overall Frequency Response Adjustment	400 Hz (0 dB) and 20 Hz to 17 kHz (-20 dB) to Input Jacks	VTVM to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 $\mu$ s (ZX/SX) 120 $\mu$ s (EX) Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. L102,L202	1. Set the BX-150 in Record/Pause mode. 2. Feed in 400 Hz, then set the Input Level control to obtain 0 dB (500 mV) on the VTVM. 3. Decrease the generator output control by 20 dB. 4. Feed in 20 Hz to 17 kHz (-20 dB) and record, rewind and play them back, then check to insure whether the output levels are within -20 dB $\pm$ 4 dB. 5. If above is not sufficient, adjust L102 (L202) to obtain approx. -20 dB on the VTVM, then conduct step 10 "Record Level Calibration and Recording Bias Current Adjustment". 6. If above is not sufficient, precise re-adjustment of step 6 "Playback Frequency Response", replacement of Record/Playback Head or check on item 2,5 "Tape Travelling Check" will be required.
12	Crosstalk Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF		1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037B). 3. Turn the cassette tape the other way round and play it back. 4. Measure the difference between 2 and 3.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
13	Channel Separation Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 $\mu$ s Dolby NR SW — OFF MPX SW — OFF		<ol style="list-style-type: none"> <li>1. Erase the tape with bulk eraser.</li> <li>2. Adjust the Input Level control to obtain 0 dB on the VTVM, and set the Balance control to the extreme left (right).</li> <li>3. Record, rewind and play it back, then measure the R ch (L ch) level.</li> </ol>
14	Erase Measurement	100 Hz to Input Jacks	100 Hz Band Pass Filter and VTVM to Output Jacks	Same as above		<ol style="list-style-type: none"> <li>1. Erase the tape with bulk eraser.</li> <li>2. Adjust the Input Level control to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037B).</li> <li>3. Rewind the tape, set the Input Level control to minimum, and then record again.</li> <li>4. Rewind the tape, play it back, and then measure the difference between 2 and 3.</li> </ol>
15	Signal to Noise Ratio Measurement	400 Hz to Input Jacks	IHF-A Curve, Filter, VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 $\mu$ s Dolby NR SW — B-Type/C-Type MPX SW — OFF		<ol style="list-style-type: none"> <li>1. Set the Dolby NR switch to B-Type/C-Type.</li> <li>2. Feed in 400 Hz, then record, rewind and play it back.</li> <li>3. Adjust the Input Level control to obtain 3% total harmonic distortion in Playback mode.</li> <li>4. Set the Input Level control to minimum then record again.</li> <li>5. After rewind, play back and check the output level difference between 3 and 4.</li> </ol> <p>Note: The filter of IHF-A curve shall be used in the measurements.</p>
16	Total Harmonic Distortion Measurement	400 Hz to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 $\mu$ s (ZX/SX) 120 $\mu$ s (EX) Dolby NR SW — OFF MPX SW — OFF		<ol style="list-style-type: none"> <li>1. Adjust the Input Level control to obtain 0 dB on the VTVM.</li> <li>2. Record, rewind and play it back.</li> <li>3. Read the distortion meter and check to insure that the distortion is as follows:  EXII . . . . . 1.0% or less  SX . . . . . 1.2% or less  ZX . . . . . 1.0% or less </li> </ol>
17	Wow/Flutter Measurement	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Wow/Flutter Meter to Output Jacks	Playback Eq. SW — 70 $\mu$ s		Play back and read the wow/flutter meter.

#### 4.2. Playback Frequency Response Adjustment

Figs. 4.1 and 4.2 show the playback amp. circuit for adjustment and the playback equalization curve.

This adjustment will be required if playback level is not sufficient during playing back a 20 kHz PB frequency response tape.

The peaking portion of the equalization curve compensates the gap loss of the playback head. Peaking level is varied by the short circuit of R110 (R210) or R195 (R295).

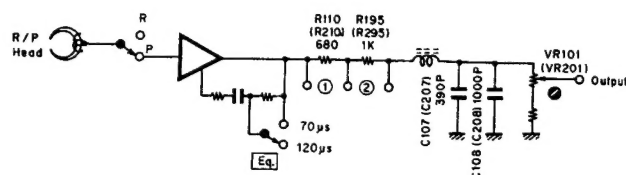


Fig. 4.1

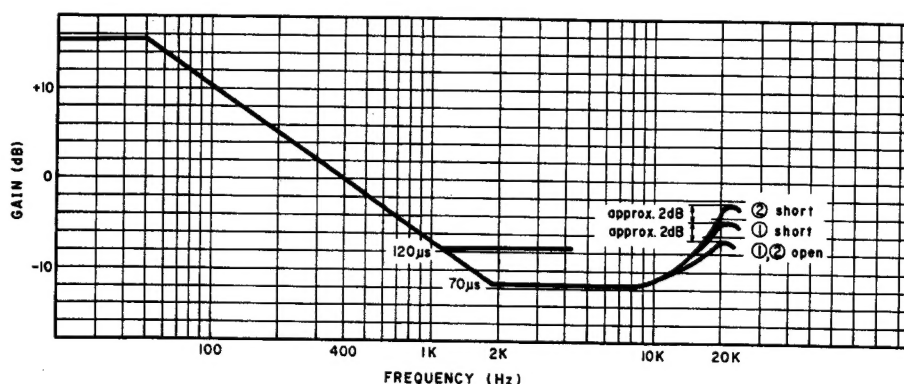


Fig. 4.2

#### 4.3. Dolby NR Circuit Check

Dolby NR circuit incorporates Dolby NR ICs which have no adjustment point. Perform the following checks and make sure that the IC operates accurately, i.e., frequency response through IC is accurate.

##### 4.3.1. Dolby NR B-Type Circuit Check

###### (1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C134 (C234) on Main P.C.B. (Positive side is connected to IC101-9 (IC201-9)).  
Output Connection: VTVM to test point TP101 (TP201) on Main P.C.B.  
Mode: Stop  
Dolby NR SW — ON (B-Type)/OFF

- Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- Set the Dolby NR switch to B-Type. Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
- Set the Dolby NR switch to OFF. Check to insure that the reading is +3.2 dB  $\pm$  1.5 dB on the VTVM.

###### (2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks  
Output Connection: VTVM to test point TP101 (TP201) and negative side of C140 (C240) on the Main P.C.B.  
Mode: Record/Pause  
Dolby NR SW — ON (B-Type)/OFF

- Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- Feed in 1.4 kHz and adjust the Input level control to obtain 35 mV/11.1 mV on the VTVM.
- Remove the VTVM from TP101 (TP201) and reconnect it to negative side of C140 (C240).
- Check to insure that the reading at C140 (C240) corresponds to the following with Dolby NR switch OFF and B-Type.

Input Level at TP101 (TP201)	Level at negative side of C140 (C240)	
	Dolby NR OFF	Dolby NR B-Type
35 mV	0 dB	+3.2 dB $\pm$ 1.5 dB
11.1 mV	0 dB	+8.2 dB $\pm$ 1.5 dB

##### 4.3.2. Dolby NR C-Type Circuit Check

###### (1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C134 (C234) on Main P.C.B. (Positive side is connected to IC101-9 (IC201-9)).  
Output Connection: VTVM to test point TP101 (TP201) on Main P.C.B.  
Mode: Stop  
Dolby NR SW — ON (C-Type)/OFF

- Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- Set the Dolby NR switch to C-Type. Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
- Set the Dolby NR switch to OFF. Check to insure that the reading is +6.5 dB  $\pm$  1.5 dB on the VTVM.

###### (2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks  
Output Connection: VTVM to test point TP101 (TP201) and negative side of C140 (C240) on the Main P.C.B.  
Mode: Record/Pause  
Dolby NR SW — ON (C-Type)/OFF

- Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- Feed in 1.4 kHz and adjust the Input level control to obtain 35 mV/11.1 mV on the VTVM.
- Remove the VTVM from TP101 (TP201) and reconnect it to negative side of C140 (C240).

- Check to insure that the reading at C140 (C240) corresponds to the following with Dolby NR switch OFF and C-Type.

Input Level at TP101 (TP201)	Level at negative side of C140 (C240)	
	Dolby NR OFF	Dolby NR C-Type
35 mV	0 dB	+6.5 dB $\pm$ 1.5 dB
11.1 mV	0 dB	+11.4 dB $\pm$ 1.5 dB

## 5. MECHANISM ASS'Y AND PARTS LIST

### 5.1. Synthesis

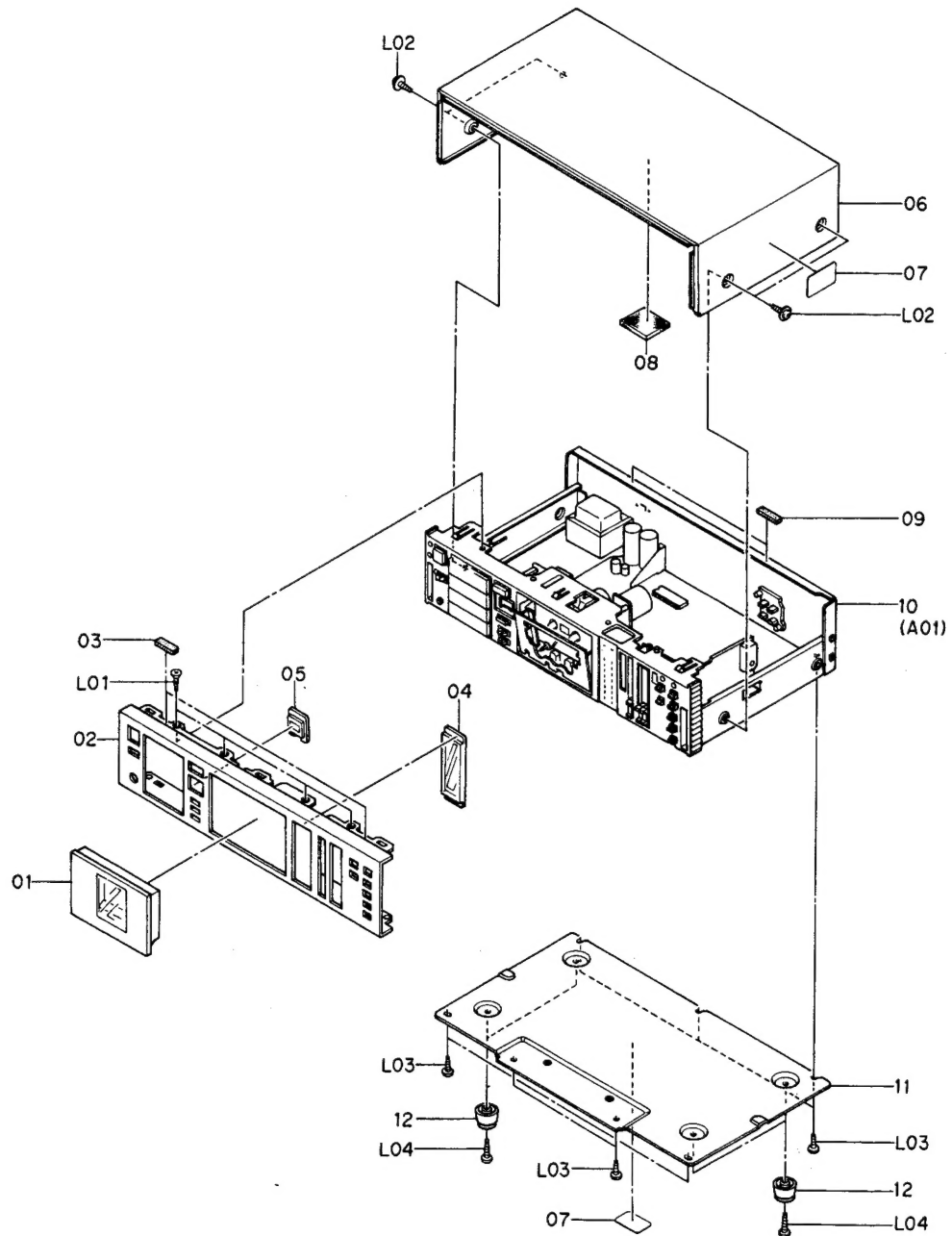


Fig. 5.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis Serial No.: A32001001 - (Silver)				Synthesis Serial No.: A32101001 - (Black)	
01	HA04494A	Cassette Case Cover Ass'y	1	01	HA04495A	Cassette Case Cover Ass'y	1
02	OH04265A	Front Panel BX-150	1	02	OH04266A	Front Panel BX-150	1
	OH04360A	Front Panel BX-150E	1		OH04361A	Front Panel BX-150E	1
03	OJ04628A	Top Cover Cushion (Front)	2	03	OJ04628A	Top Cover Cushion (Front)	2
04	OH04308A	Meter Cover	1	04	OH04308A	Meter Cover	1
05	OH04293A	Counter Cover	1	05	OH04293A	Counter Cover	1
06	OH04155B	Top Cover	1	06	OH04156B	Top Cover	1
07	OM04377A	Caution Label	1	07	OM04377A	Caution Label	1
08	OJ04630A	Top Cover Rubber	1	08	OJ04630A	Top Cover Rubber	1
09	OJ04629A	Top Cover Cushion (Rear)	2	09	OJ04629A	Top Cover Cushion (Rear)	2
10	—	Synthesis Mechanism Ass'y	1	10	—	Synthesis Mechanism Ass'y	1
11	OJ04762A	Bottom Cover	1	11	OJ04762A	Bottom Cover	1
12	OJ03564A	Leg T-H	4	12	OJ03564A	Leg T-H	4
L01	OE03054A	BT 3x8 @ Countersunk	4	L01	OE03054A	BT 3x8 @ Countersunk	4
L02	OE03033A	BT 4x8 @ Pan Washer-Faced	4	L02	OE03033A	BT 4x8 @ Pan Washer-Faced	4
L03	OE00868A	BT 3x8 @ Binding	7	L03	OE00868A	BT 3x8 @ Binding	7
L04	OE00865A	BT 3x10 @ Binding	4	L04	OE00865A	BT 3x10 @ Binding	4

## 5.2. Synthesis Mechanism Ass'y (A01)

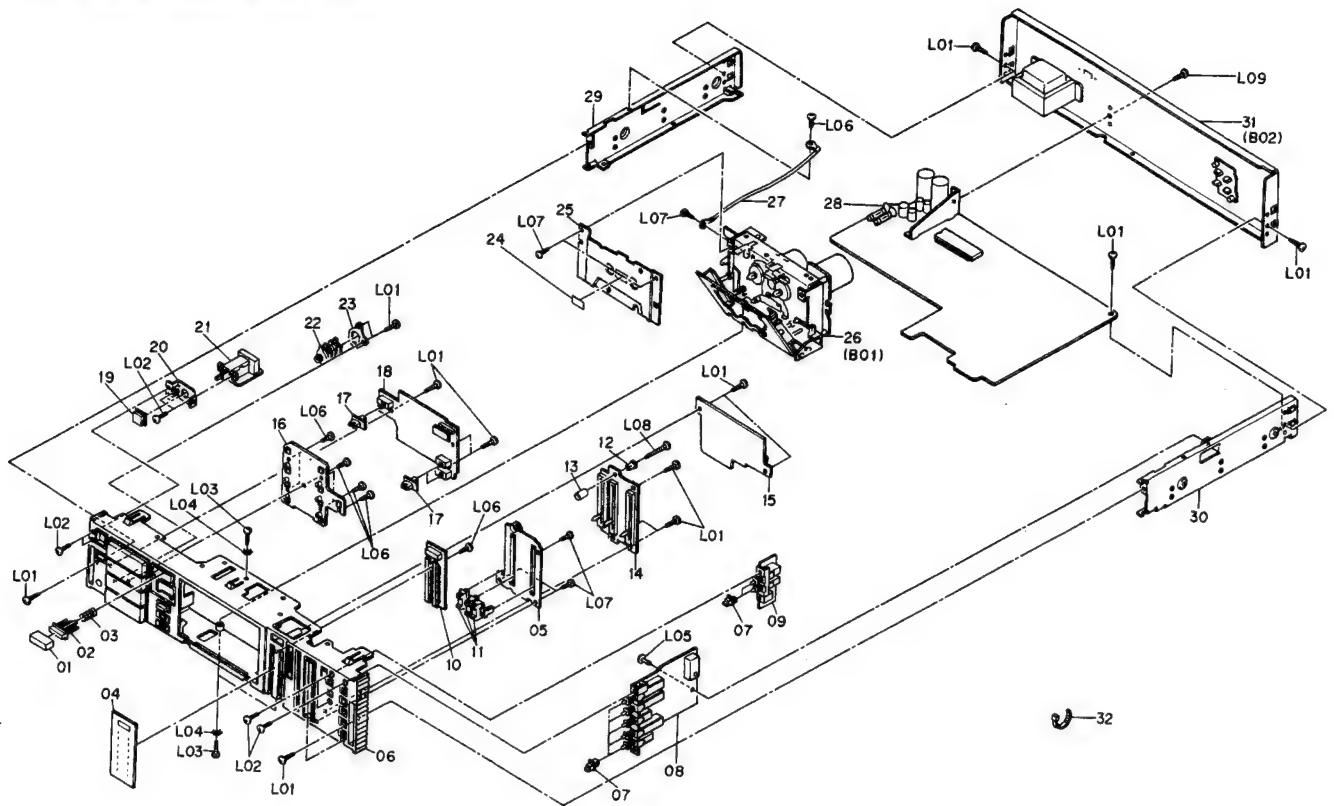


Fig. 5.2



Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01		Synthesis Mechanism Ass'y Serial No.: A32001001 - (Silver)	1	A01		Synthesis Mechanism Ass'y Serial No.: A32101001 - (Black)	1
01	OH04270A	Eject Button	1	01	OH04269A	Eject Button	1
02	OJ04766A	Button Joint	1	02	OJ04766A	Button Joint	1
03	OJ04765A	Spring	1	03	OJ04765A	Spring	1
04	OH04279A	Meter Scale	1	04	OH04279A	Meter Scale	1
05	OH04285A	Volume Plate	1	05	OH04285A	Volume Plate	1
06	HA04524A	Front Chassis Ass'y	1	06	HA04525A	Front Chassis Ass'y	1
07	OH04288A	Push Switch Button	7	07	OH04248A	Push Switch Button	7
08	BA05100A	Tape Switch P.C.B. Ass'y	1	08	BA05100A	Tape Switch P.C.B. Ass'y	1
09	BA05103A	Dolby NR Switch P.C.B. Ass'y	1	09	BA05103A	Dolby NR Switch P.C.B. Ass'y	1
10	BA05135A	Indicator Ass'y	1	10	BA05135A	Indicator Ass'y	1
11	OH04289A	Volume Knob	3	11	OH04247A	Volume Knob	3
12	OJ04704A	P.C.B. Spacer B	1	12	OJ04704A	P.C.B. Spacer B	1
13	OJ04703A	P.C.B. Spacer A	1	13	OJ04703A	P.C.B. Spacer A	1
14	BA05102A	Volume P.C.B. Ass'y	1	14	BA05102A	Volume P.C.B. Ass'y	1
15	BA05101A	Indicator P.C.B. Ass'y	1	15	BA05101A	Indicator P.C.B. Ass'y	1
16	BA05104A	Control Switch P.C.B. Ass'y	1	16	BA05104A	Control Switch P.C.B. Ass'y	1
17	OH04309A	Slide Switch Knob	3	17	OH04242A	Slide Switch Knob	3
18	BA05105A	Counter P.C.B. Ass'y	1	18	BA05105A	Counter P.C.B. Ass'y	1
19	OH04290A	Power Switch Button	1	19	OH04243A	Power Switch Button	1
20	OJ04763A	Power Switch Holder	1	20	OJ04763A	Power Switch Holder	1
21	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A. & Canada))	1	21	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A. & Canada))	1
	BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia & Others) & BX-150E)	1		BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia & Others) & BX-150E)	1
	BA04825A	Power Switch P.C.B. Ass'y (BX-150 (Japan))	1		BA04825A	Power Switch P.C.B. Ass'y (BX-150 (Japan))	1
22	OB08511A	Headphone Jack	1	22	OB08511A	Headphone Jack	1
23	OJ04611A	Headphone Plate	1	23	OJ04611A	Headphone Plate	1
24	OM04196A	Cassette Label	1	24	OM04196A	Cassette Label	1
25	OH04154B	Cover Plate	1	25	OH04154B	Cover Plate	1
26	CA08498A	Mechanism Ass'y	1	26	CA08498A	Mechanism Ass'y	1
27	BA05131A	Earth Wire	1	27	BA05131A	Earth Wire	1
28	BA05090A	Main P.C.B. Ass'y	1	28	BA05090A	Main P.C.B. Ass'y	1
29	OJ04603E	Side Chassis L	1	29	OJ04603E	Side Chassis L	1
30	OJ04773A	Side Chassis R	1	30	OJ04773A	Side Chassis R	1
31	HA04511A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1	31	HA04517A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04512A	Rear Panel Ass'y BX-150 (Japan)	1		HA04518A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04513A	Rear Panel Ass'y BX-150 (Others)	1		HA04519A	Rear Panel Ass'y BX-150 (Others)	1
	HA04514A	Rear Panel Ass'y BX-150 (Australia)	1		HA04520A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04510A	Rear Panel Ass'y BX-150E (UK)	1		HA04516A	Rear Panel Ass'y BX-150E (UK)	1
	HA04515A	Rear Panel Ass'y BX-150E (220V Class 2)	1		HA04521A	Rear Panel Ass'y BX-150E (220V Class 2)	1
32	OB08515A	Insu-Lock	1	32	OB08515A	Insu-Lock	1
L01	OE00868A	BT 3x8 @ Binding	16	L01	OE00868A	BT 3x8 @ Binding	16
L02	OE00766A	M3x8 @ Binding	6	L02	OE00766A	M3x8 @ Binding	6
L03	OE03074A	BT 2.6x8 @ Binding	2	L03	OE03074A	BT 2.6x8 @ Binding	2
L04	OE00233A	Washer 2.6mm Toothed Lock	2	L04	OE00233A	Washer 2.6mm Toothed Lock	2
L05	OB08583A	Plastic Rivet	1	L05	OB08583A	Plastic Rivet	1
L06	OE00857A	BT 3x6 @ Binding	7	L06	OE00857A	BT 3x6 @ Binding	7
L07	OE00859A	BT 2.6x6 @ Binding	6	L07	OE00859A	BT 2.6x6 @ Binding	6
L08	OE00835A	BT 3x25 @ Pan	1	L08	OE00835A	BT 3x25 @ Pan	1
L09	OE03028A	BT 3x8 @ Binding (Nickel)	1	L09	OE00921A	BT 3x8 @ Binding (Black Chromate)	1

### 5.3. Mechanism Assy (B01)

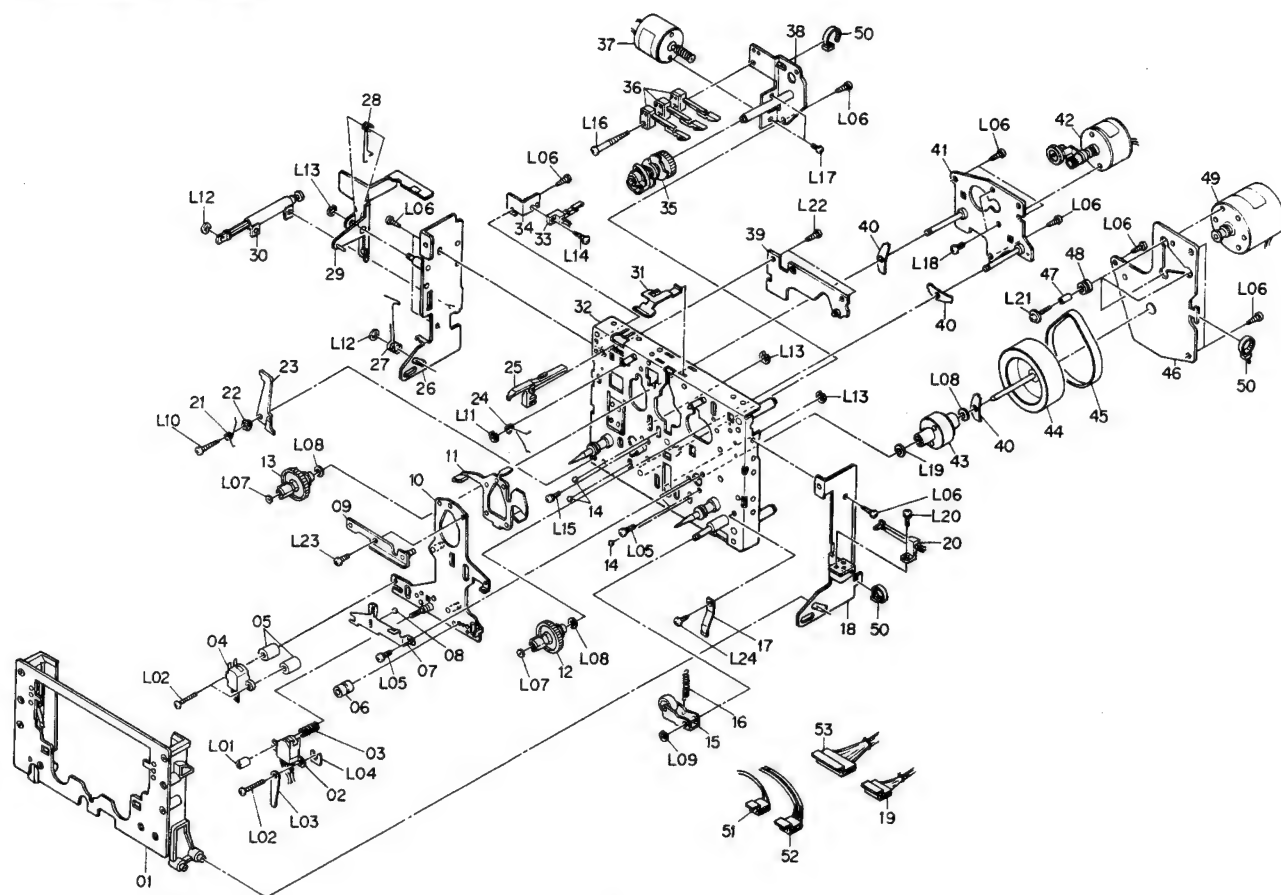


Fig. 5.3

Schematic Ref. No.	Part No.	Description	Qty
B01	CA08498A	Mechanism Ass'y Serial No.: A320.101001 -	1
01	CA80001A	Cassette Case Ass'y	1
02	0G01371A	Record/Playback Head RP-2G	1
03	0C80001A	Azimuth Adjust Spring	1
04	0G01365A	Erase Head E-2D	1
05	0C80044A	Erase Head Collar	2
06	0C80045A	Record/Playback Head Collar	1
07	0C80003A	Head Base Hold Plate	1
08	0C80004A	Steel Ball 30	1
09	0C80005A	Reinforce Plate	1
10	0C80006A	Head Base	1
11	CA80002A	Brake Ass'y	1
12	CA80003B	Take-up Reel Hub Ass'y	1
13	CA80004B	Supply Reel Hub Ass'y	1
14	0C80007A	Steel Ball 20	3
15	CA80005A	Pressure Roller Ass'y	1
16	0C80008A	Pressure Roller Spring	1
17	0C80009A	Cassette Case Spring	1
18	0C80010B	Cassette Case Holder R	1
19	0C80043A	5P-H Connector	1
20	0C80012A	Eject Sensor	1
21	0C80013A	Lock Lever Spring	1
22	0C80014A	Lock Lever Collar	1
23	0C80015B	Lock Lever	1
24	0C80016A	Brake Spring	1
25	0C80017A	Record Protector Lever	1
26	0C80018A	Cassette Case Holder L	1
27	0C80019B	Eject Spring	1
28	0C80020A	Eject Lever Spring	1
29	0C80021A	Eject Lever	1
30	CA80006A	Pneumatic Damper Ass'y	1
31	0C80022B	Cassette Hold Spring	1
32	0C80023A	Mechanism Chassis	1
33	0C80024A	Record Protector	1
34	0C80025A	Record Protector Holder	1
35	0C80026A	Cam	1
36	0C80027A	Mode Switch	3
37	CA80007A	Control Motor Ass'y	1
38	0C80028A	Control Motor Holder	1
39	CA80011A	Shut-off P.C.B. Ass'y	1
40	0C80029A	Back Tension Spring	3
41	0C80030A	Reel Motor Holder	1
42	CA80008B	Reel Motor Ass'y	1
43	0C80031A	Capstan Flange	1
44	0C80033A	Flywheel	1
45	0C80034A	Capstan Belt	1
46	CA80009A	Flywheel Holder Ass'y	1
47	0C80035A	Sleeve	3
48	0C80036A	Floating Rubber	3
49	CA80010A	Capstan Motor Ass'y	1
50	0C80037A	Ingu-Lock	3
51	0C80040A	2P-H Connector	1
52	0C80041A	4P-H Connector	1
53	0C80042A	9P-H Connector	1
L01	0C80046A	Azimuth Adjust Screw	1
L02	0E03038A	M2x12 @ Binding	3
L03	0E03053A	Wire Holder	1
L04	0C80048A	Shim 0.03T	(1)
	0C80038A	Shim 0.06T	(1)
	0C80039A	Shim 0.1T	(1)
L05	0E03046A	M2.6x6 @ Pan (2A)	3
L06	0E03042A	FT M2.5x5 @ Pan	12
L07	0E03049A	Washer 1.8mm FT	2
L08	0E03050A	Washer 3.1mm FT	3
L09	0E0222A	E-Ring 2mm	1
L10	0E03043A	FT M2.5x10 @ Pan	1
L11	0E00698A	E-Ring 2.5mm	1
L12	0E03052A	Stopper Ring 2.4mm	2
L13	0E00181A	E-Ring 3mm	3
L14	0E03048A	FT M2.6x6 @ Pan	1
L15	0E03036A	M2x4 @ Pan (2A)	1
L16	0E03044A	FT M2.5x20 @ Pan	1
L17	0E00691A	M2x3 @ Pan	2
L18	0E03045A	M2.6x3 2 Binding	2
L19	0E03051A	Capstan Washer	1
L20	0E03037A	M2x5 @ Pan (2A)	1
L21	0E03047A	M2.6x9 @ Pan	3
L22	0E03041A	FT M2.5x4 @ Pan	2
L23	0E03040A	FT M2.5x3.5 @ Pan	1
L24	0E03035A	M2x3.2 @ Truss	1

#### 5.4. Rear Panel Ass'y (B02)

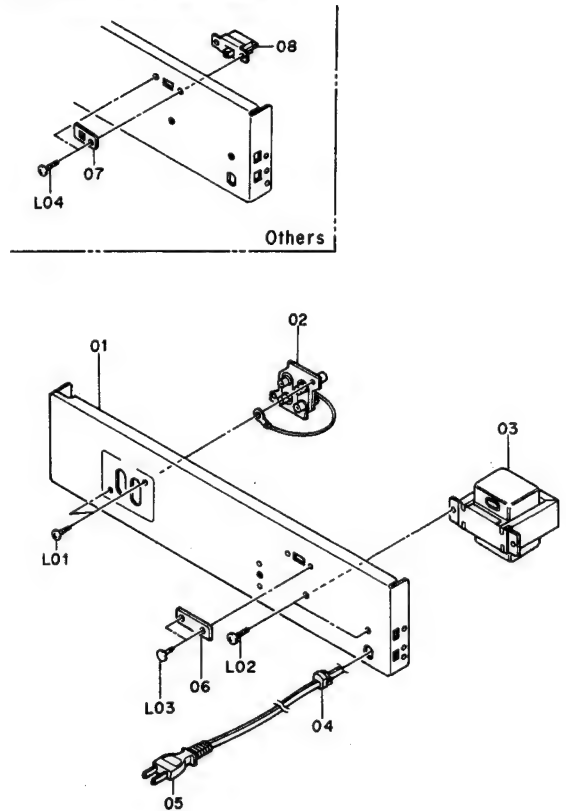


Fig. 5.4

Schematic Ref. No.	Part No.	Description	Qty
B02	HA04511A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04512A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04513A	Rear Panel Ass'y BX-150 (Others)	1
	HA04514A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04510A	Rear Panel Ass'y BX-150E (UK)	1
	HA04515A	Rear Panel Ass'y BX-150E (220V Class 2) Serial No.: A32001001 - (Silver)	1
01	OH04300A	Rear Panel BX-150	1
	OH04364A	Rear Panel BX-150E	1
02	OB81001A	4P PIN Jack	1
03	OB50017A	Power Transformer (BX-150 (U.S.A. & Canada))	1
	OB50011A	Power Transformer (BX-150 (Japan))	1
	OB50009A	Power Transformer (BX-150 (Australia) & BX-150E)	1
	OB50010A	Power Transformer (BX-150 (Others))	1
04	OB08037A	Cord Bushing 4P-4 (BX-150 & BX-150E (220V Class 2))	1
	OB08351A	Cord Bushing 4K-4 (BX-150E (UK))	1
05	OB08533A	Power Cord (BX-150 (U.S.A. & Canada & Others))	1
	OB08219B	Power Cord (BX-150 (Japan))	1
	OB08348A	Power Cord (BX-150E (UK))	1
	OB08093U	Power Cord (BX-150E (220V Class 2))	1
06	OB05241A	Power Cord (BX-150 (Australia))	1
	OJ04622B	Switch Cover Gray (BX-150 (U.S.A., Canada, Japan & Australia) & BX-150E)	1
07	OM04407A	Voltage Selector Lock Plate Gray (BX-150 (Others))	1
08	OB07092U	Voltage Selector (BX-150 (Others))	1
L01	OE03028A	BT 3x8 @ Binding (Nickel)	2
L02	OE03024A	BT 4x8 @ Binding (Nickel)	2
L03	OB08583A	Plastic Rivet	2
L04	OE03031A	M3x8 @ Binding (Nickel)	2
B02	HA04517A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04518A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04519A	Rear Panel Ass'y BX-150 (Others)	1
	HA04520A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04516A	Rear Panel Ass'y BX-150E (UK)	1
	HA04521A	Rear Panel Ass'y BX-150E (220V Class 2) Serial No.: A32101001 - (Black)	1
01	OH04301A	Rear Panel BX-150	1
	OH04365A	Rear Panel BX-150E	1
02	OB81001A	4P PIN Jack	1
03	OB50017A	Power Transformer (BX-150 (U.S.A. & Canada))	1
	OB50011A	Power Transformer (BX-150 (Japan))	1
	OB50009A	Power Transformer (BX-150 (Australia) & BX-150E)	1
	OB50010A	Power Transformer (BX-150 (Others))	1
04	OB08037A	Cord Bushing 4P-4 (BX-150 & BX-150E (220V Class 2))	1
	OB08351A	Cord Bushing 4K-4 (BX-150E (UK))	1
05	OB08533A	Power Cord (BX-150 (U.S.A. & Canada & Others))	1
	OB08219B	Power Cord (BX-150 (Japan))	1
	OB08348A	Power Cord (BX-150E (UK))	1
	OB08093U	Power Cord (BX-150E (220V Class 2))	1
06	OB05241A	Power Cord (BX-150 (Australia))	1
	OJ04601B	Switch Cover Black (BX-150 (U.S.A., Canada, Japan & Australia) & BX-150E)	1
07	OM03948A	Voltage Selector Lock Plate Black (BX-150 (Others))	1
08	OB07092U	Voltage Selector (BX-150 (Others))	1
L01	OE00921A	BT 3x8 @ Binding (Black Chromate)	2
L02	OE00915A	BT 4x8 @ Binding (Black Chromate)	2
L03	OB08583A	Plastic Rivet	2
L04	OE00818A	M3x8 @ Binding (Black Chromate)	2

## 6. MOUNTING DIAGRAMS AND PARTS LIST

- Notes: 1. Mounting diagram shows a dip side view of the printed circuit board.  
 2. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.  
 3. Following transistors are interchangeable with each other.  
 a. 2SA733, 2SA608SP, 2SA1048, 2SA1175  
 b. 2SC945, 2SC536SP, 2SC2458, 2SC2785  
 4. Abbreviation for part name:  
 TR — Transistor, SiD — Silicon Diode, GD — Germanium Diode, ZD — Zener Diode  
 RK — Carbon Resistor, RM — Metal Film Resistor, RF — Fail Safe Type Resistor, RC — Cement Resistor,  
 RW — Wire Wound Resistor  
 CE — Electrolytic Capacitor, CM — Mylar Capacitor, CC — Ceramic Capacitor, CP — PP Capacitor,  
 CT — Tantalum Capacitor, CM — Film Capacitor, C — Mica Capacitor

6.1. Power Switch P.C.B. Ass'y

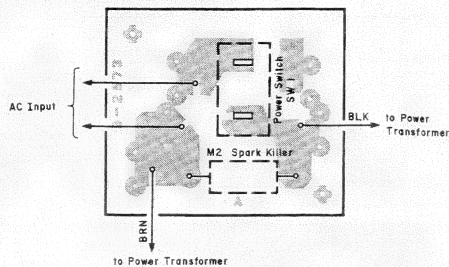


Fig. 6.1

6.2. Dolby NR Switch P.C.B. Ass'y

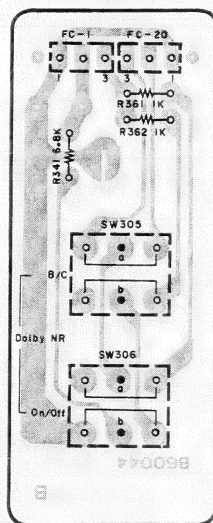


Fig. 6.2

6.3. Shut-off P.C.B. Ass'y

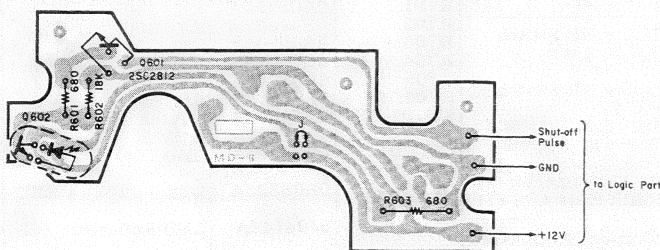


Fig. 6.3

6.4. Volume P.C.B. Ass'y

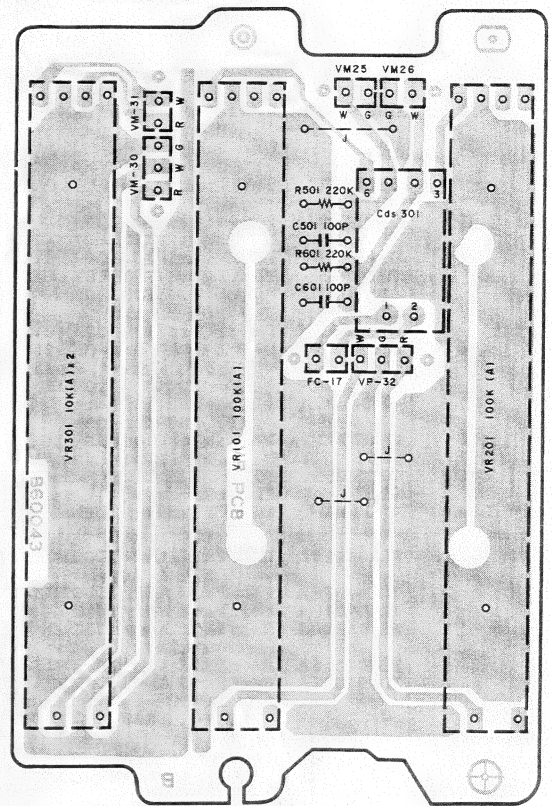
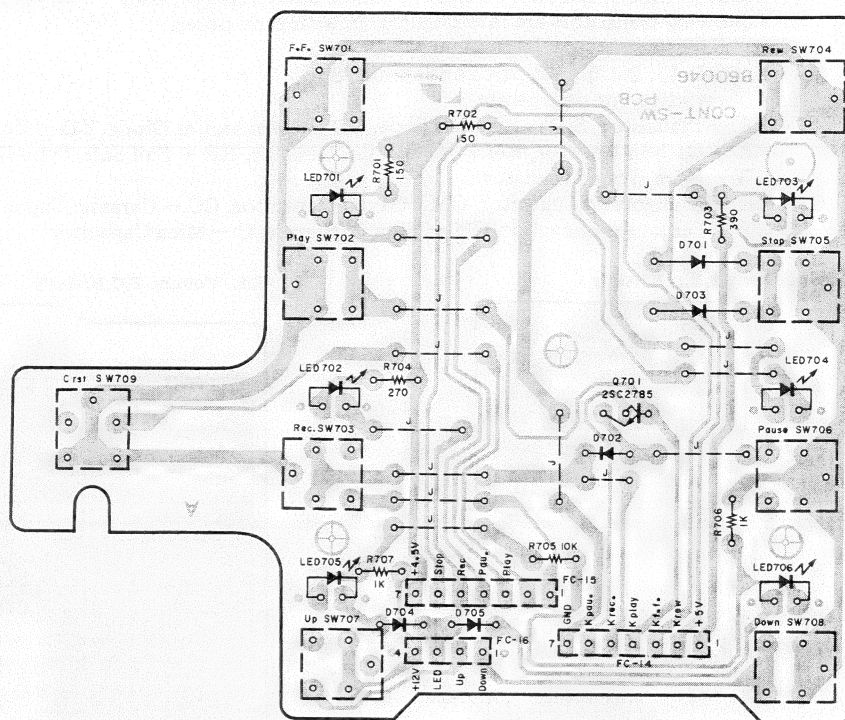


Fig. 6.4



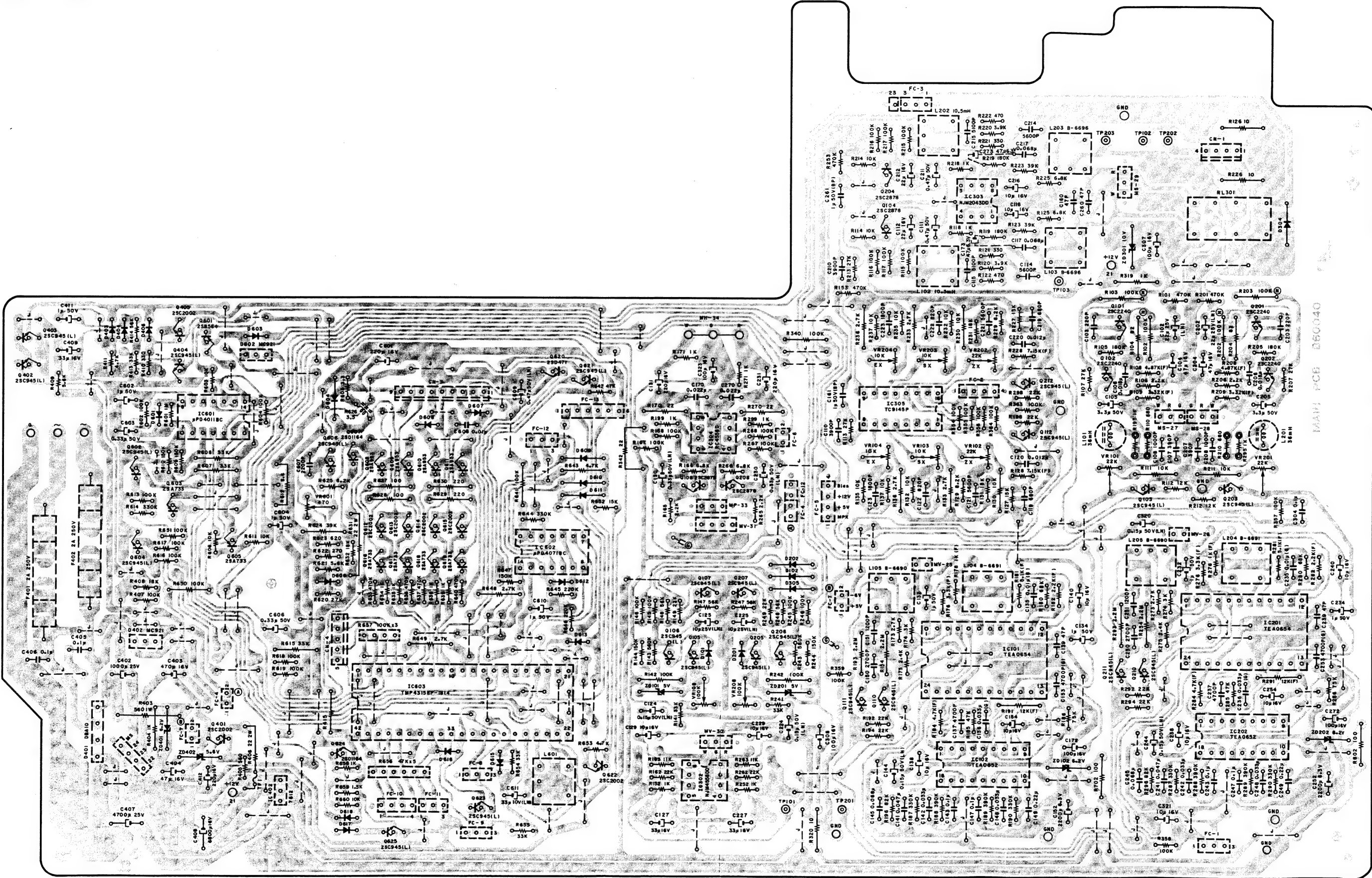
# 6.5. Control Switch P.C.B. Ass'y





Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05090A	Main P.C.B. Ass'y	R354,355	OB09725A	RK 100K 1/6W J	VR108,208	OB32011A	Semi-fixed VR 100K	R634,635	OB09677A	RK 1K 1/6W J
	— PB Eq. Amp. —		356,363			R141,241	OB09713A	RK 33K 1/6W J	638,639		
Q101,102	OB06142A	TR 2SC2240 (BL)	364			R142,242	OB01889A	RK 100K 1/4W J	658		
201,202			C119,219	OB05571A	CM 680P 50V J	R143,243	OB09743A	RK 560K 1/6W J	R641,650	OB01889A	RK 100K 1/4W J
Q103,203	OB01872A	TR 2SC945L (P,Q)	C120,220	OB05843A	CM 0.012μ 50V J	R144,244	OB09729A	RK 150K 1/6W J	R642	OB09717A	RK 47K 1/6W J
ZD301	OB12009A	ZD 10V RD10JB2T	C121,221	OB05659A	CM 5600P 50V J	R145,146	OB09725A	RK 100K 1/6W J	R643	OB01846A	RK 4.7K 1/4W J
D304	OB01909A	SiD 1S1555	C122,222	OB09993A	CM 820P 50V J	245,246			R645,646	OB09733A	RK 220K 1/6W J
L101,201	OB03919B	Inductor 36mH	C123,223	OB01913A	CM 1800P 50V J	R147,148			R648,649	OB05629A	RK 2.7K 1/4W J
VR101,201	OB32009A	Semi-fixed VR 22K		— Dolby NR —		247,248	OB09719A	RK 56K 1/6W J	R652	OB09705A	RK 15K 1/6W J
R101,201	OB09741A	RK 470K 1/6W J	IC101,201	OB06383A	IC TEA0654	R149,249	OB09709A	RK 22K 1/6W J	R653	OB09693A	RK 4.7K 1/6W J
R102,103	OB09330A	RK 100K 1/4W J	IC102,202	OB06382A	IC TEA0652	R320	OB09216A	RF 10 1/4W J	R654,655	OB09713A	RK 33K 1/6W J
202,203		(Noiseless)	Q110,111	OB01872A	TR 2SC945L (P,Q)	C124,224	OB09570A	CE 0.15μ 50V (LN)	R656	OB09803A	R-Network 47Kx5
R104,204	OB05631A	RK 82 1/4W J	210,211			C125,225	OB09148A	CE 10μ 25V (LN)	R657	OB09824A	R-Network 100Kx3
R105,205	OB09731A	RK 180K 1/6W J	ZD102,202	OB06167A	ZD 6.2V RD6.2EB3	C308	OB01400A	CE 100μ 16V	R659	OB09681A	RK 1.5K 1/6W J
R106,206	OB09685A	RK 2.2K 1/6W J	L104,204	OB06691A	L-C Block YEL		— Headphone Amp. —		C601	OB40079A	CE 220μ 16V
R107,207	OB09711A	RK 27K 1/6W J	L105,205	OB06690A	L-C Block BLUE	IC304	OB06370A	IC 4556D	C602,604	OB01405A	CE 1μ 50V
R108,208	OB09830A	RM 4.87K 1/4W F	R154,193	OB05671A	RK 2.2M 1/4W J	Q108,208	OB06299A	TR 2SC2878	C603,606	OB40024A	CE 0.33μ 50V
R109,209	OB09829A	RM 3.32K 1/4W F	254,293			R165,265	OB09685A	RK 2.2K 1/6W J	C607	OB01802A	CM 2200P 50V J
R110,210	OB09673A	RK 680 1/6W J	R173,273	OB09687A	RK 2.7K 1/6W J	R166,266	OB09697A	RK 6.8K 1/6W J	C608	OB09290A	CC 0.01μ 50V Z
R111,211	OB01888A	RK 10K 1/4W J	R174,274	OB09688A	RK 3K 1/6W J	R167,168	OB09725A	RK 100K 1/6W J	C609	OB09222A	CE 0.47μ 50V (LN)
R112,212	OB09703A	RK 12K 1/6W J	R175,275	OB09686A	RK 2.4K 1/6W J	267,268			C611	OB09817A	CE 33μ 10V (LN)
R195,295	OB09677A	RK 1K 1/6W J	R176,276	OB22286A	RM 3.30K 1/6W F	R170,270	OB05579A	RK 22 1/4W J		OB02243A	5P-T Post (1)
R319	OB01857A	RK 1K 1/4W J	R178,278	OB22229A	RM 1.00K 1/6W F	R171,199	OB09677A	RK 1K 1/6W J		OB02245A	9P-T Post (1)
R357	OB09725A	RK 100K 1/6W J	R180,280	OB09721A	RK 68K 1/6W J	271,299			— DC Supply —		
C102,202	OB09137A	CE 22μ 25V (LN)	R181,281	OB22309A	RM 5.10K 1/6W F	R342	OB09049A	RF 22 1/4W J			
C103,203	OB09283A	CC 220P 50V K	R182,282	OB22265A	RM 2.20K 1/6W F	C130,230	OB09327A	CE 0.33μ 50V (LN)	IC402	OB06380A	IC NJM7812
C104,204	OB01403A	CE 47μ 16V	R184,284	OB22305A	RM 4.70K 1/6W F	C131,231	OB01398A	CE 220μ 16V	Q401,405	OB06322A	TR 2SC2002 (K,L)
C105,205	OB01863A	CE 3.3μ 50V	R185,285	OB09717A	RK 47K 1/6W J	C170,270	OB09291A	CC 0.022μ 50V Z	Q402,403	OB01872A	TR 2SC945L (P,Q)
C106,206	OB05832A	CM 0.018μ 50V J	R186,286	OB09722A	RK 75K 1/6W J	C323	OB01400A	CE 100μ 16V	404		
C107,207	OB41002A	CP 390P 100V J	R187,190	OB09737A	RK 330K 1/6W J		— Logic —		ZD401	OB06167A	ZD 6.2V RD6.2EB3
C108,208	OB05550A	CM 1000P 50V J	287,290			IC601	OB06178A	IC μPD4011BC	ZD402	OB12003A	ZD 5.6V RD5.6JB2T
C304	OB09868A	CF 0.1μ 50V J	R188,189	OB09739A	RK 390K 1/6W J	IC602	OB06214A	IC μPD4071BC	D401	OB06282A	Diode Bridge DBA10
C307	OB01400A	CE 100μ 16V	288,289			IC603	OB11020A	IC TMP4315BP-1814	D402	OB12100A	Double SiD MC921
RL301	OB90011A	DS Relay	R191,291	OB09796A	RM 12K 1/4W F	Q601	OB06332A	TR 2SB564M	D403,404	OB06398A	SiD 1SS176
CN1	OB02242A	4P-T Post	R192,194	OB09709A	RK 22K 1/6W J	Q602,604	OB01872A	TR 2SC945L (P,Q)	406		
	— Rec. Eq. Amp. —		292,294			Q603,605			R403	OB24006A	RF 560 1W J
IC303	OB06387A	IC NJM2043DD	R196,296	OB09723A	RK 82K 1/6W J	616,617			R404	OB01857A	RK 1K 1/4W J
Q104,204	OB06299A	TR 2SC2878	R340	OB09330A	RK 100K 1/4W J	618,619			R405	OB09671A	RK 560 1/6W J
L102,202	OB00068A	Trap Coil 10.5mH	R358,359	OB09725A	RK 100K 1/6W J	623,625			R406	OB24007A	RF 22 2W J
L103,203	OB06696A	L-C Block	R702,802	OB01679A	RK 100 1/4W J	Q607,624			R407	OB09725A	RK 100K 1/6W J
R113,213	OB09711A	RK 27K 1/6W J	C132,134	OB40185A	CE 1μ 50V	618,619	OB06013A	TR 2SA733 (P,Q)	R408	OB09707A	RK 18K 1/6W J
R114,214	OB09701A	RK 10K 1/6W J	232,234			Q607,624			R409	OB09695A	RK 5.6K 1/6W J
R115,116	OB09725A	RK 100K 1/6W J	C135,235	OB09312A	CP 0.01μ 100V G	Q608,609			R410	OB09665A	RK 330 1/6W J
117,215			C136,236	OB09240A	CP 0.033μ 100V G	610,611	OB10021A	TR 2SD1164 (K,L)	R411	OB09693A	RK 4.7K 1/6W J
216,217			C137,237	OB05652A	CM 4700P 50V J	Q612,613	OB06372A	TR 2SA953 (K,L)	R413	OB09713A	RK 33K 1/6W J
R118,218	OB09677A	RK 1K 1/6W J	C138,140	OB01412A	CE 10μ 16V	614,615	OB06322A	TR 2SC2002 (K,L)	R414	OB09719A	RK 56K 1/6W J
R119,219	OB09731A	RK 180K 1/6W J	154,238			Q620			R415	OB24023A	R Fuse 1
R120,220	OB09691A	RK 3.9K 1/6W J	240,254			Q622	OB06066A	TR 2SD471 (L,M)	C402	OB40095A	CE 1000μ 25V
R121,221	OB09665A	RK 330 1/6W J	321	OB09280A	CC 47P 50V J	D601,603	OB10023A	TR 2SC2002 (K)	C403	OB01392A	CE 470μ 16V
R122,222	OB09669A	RK 470 1/6W J	C139,239	OB09864A	CF 0.047μ 50V J	604	OB06181A	SiD 1SS53 (15)	C404	OB01403A	CE 47μ 16V
R123,223	OB09715A	RK 39K 1/6W J	C142,148	OB09862A	CF 0.033μ 50V J	606-613			C405,406	OB09292A	CC 0.1μ 50V Z
R125,225	OB09697A	RK 6.8K 1/6W J	242,248			615-618			C407	OB09799A	CE 4700μ 25V
R126,226	OB05936A	RK 10 1/4W J	C143,147	OB09868A	CF 0.1μ 50V J	D602			C408	OB09798A	CE 6800μ 16V
R153,253	OB09741A	RK 470K 1/6W J	243,247			L601	OB12100A	Double SiD MC921	C409	OB40011A	CE 33μ 16V
C110,210	OB01804A	CM 3900P 50V J	C144,244	OB09570A	CE 0.15μ 50V (LN)	VR601	OB06689A	L-C Block	C411	OB01405A	CE 1μ 50V
C111,211	OB40178A	CE 0.47μ 50V	320			R601	OB32007A	Semi-fixed VR 470	C412	OB01398A	CE 220μ 16V
C112,212	OB01862A	CE 22μ 16V	C145,245	OB09866A	CF 0.068μ 50V J	R602,604	OB09749A	RK 1M 1/6W J	TF1	OB08715A	Thermal Fuse 129
C114,214	OB05659A	CM 5600P 50V J	C148,249	OB09872A	CF 0.22μ 50V J	613,616	OB09725A	RK 100K 1/6W J		OB08676B	Heat Sink A304 (1)
C115,215	OB41186A	CM 5100P 50V J	C150,250	OB09189A	CM 2700P 50V J	617,618				OE00507A	Nut Hex. M3 (Chromate) (1)
C116,216	OB01412A	CE 10μ 16V	C151,251	OB05687A	CM 1200P 50V J	619,651				OE00612A	M3x6 @ Pan (2A) (1)
C117,217	OB09866A	CF 0.068μ 50V J	C152,252	OB40054A	CE 2200μ 6.3V	R603,606	OB09701A	RK 10K 1/6W J		OE00857A	BT 3x6 @ Binding (Chromate) (2)
C160,260	OB09280A	CC 47P 50V J	C153,253	OB09191A	CP 4700P 100V G	611,660					
C161,261	OB09187A	CE 1μ 50V (BP)	C172,272	OB01400A	CE 100μ 16V	R605	OB09304A	RK 3.3 1/4W J			
C173,273	OB09815A	CE 47μ 6.3V		— Line Amp. —		R607,608	OB05509A	RK 33K 1/4W J			
	— Rec. Level —		IC302	OB06146A	IC NJM4558DD	615					
IC305	OB11027A	IC TC9145P	R152,252	OB09677A	RK 1K 1/6W J	R609,610	OB09729A	RK 150K 1/6W J			
Q112,212	OB01872A	TR 2SC945L (P,Q)	R162,262	OB09709A	RK 22K 1/6W J	647					
VR102,202	OB32009A	Semi-fixed VR 22K	R163,263	OB09702A	RK 11K 1/6W J	R612	OB09217A	RF 5.6 1/4W J			
VR103,104	OB32008A	Semi-fixed VR 10K	C127,227	OB09251A	CE 33μ 25V	R614,644	OB09737A	RK 330K 1/6W J			
203,204			C129,229	OB01412A	CE 10μ 16V	R620	OB09711A	RK 27K 1/6W J			
R127,227	OB09705A	RK 15K 1/6W J		— Meter Amp. —		R621	OB09695A	RK 5.6K 1/6W J			
R128,228	OB22327A	RM 7.15K 1/6W F	Q105,106	OB01872A	TR 2SC945L (P,Q)	R622	OB09663A	RK 270 1/6W J			
R129,229	OB09699A	RK 8.2K 1/6W J	107,205			R623	OB09672A	RK 620 1/6W J			
R130,230	OB01888A	RK 10K 1/4W J	206,207			R624	OB01854A	RK 39K 1/4W J			
R131,231	OB09707A	RK 18K 1/6W J	ZD101,201	OB12101A	ZD 5V 5C-1	R625	OB09699A	RK 8.2K 1/6W J			
R132,135	OB09701A	RK 10K 1/6W J	D101,201	OB06398A	SiD 1SS176	R626	OB06706A	R Coil 3.5			
137,232			D102,202	OB06181A	SiD 1SS53	R627,628	OB01679A	RK 100 1/4W J			
235,237			305			R629,630	OB01933A	RK 220 1/4W J			
R133,136	OB05629A	RK 2.7K 1/4W J				R631	OB24007A	RF 22 2W J			
238,236	OB09709A	RK 22K 1/6W J				R632	OB09707A	RK 18K 1/6W J			
R198,298						R633,636	OB09741A	RK 470K 1/6W J			
						637,640					





**Fig. 6.9.1 2nd Version**



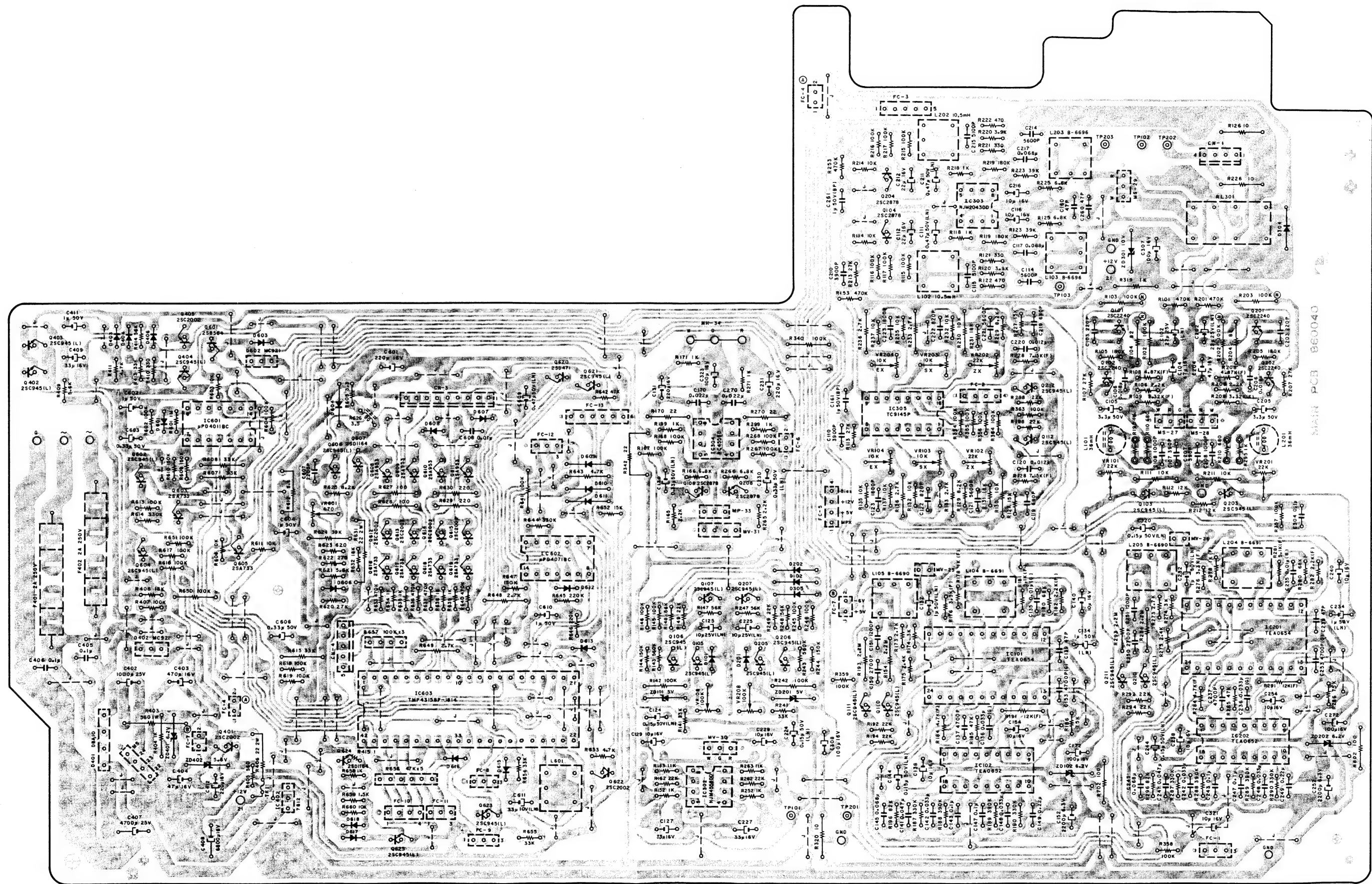


Fig. 6.9.2 1st Version

## 7. SCHEMATIC DIAGRAMS

### 7.1. Attention to Servicemen

#### (1) Caution

- If a part is in need of removing (or replacing) for service, it should be remounted (or replaced with specified parts) by the same methods as before after servicing.
- The appliance should be used only specified parts for preventing a risk of fire and electric shock and maintaining the characteristics.
- Before returning the repaired appliance to a customer, check to insure that the exposed part is accurately insulated from the Power Supply by measuring the leakage current or the insulation resistance between them.

#### (2) Parts Replacement

Following parts shall be replaced with the specified ones. Refer to the parts list.

#### (a) Power Supply Circuit

Power Cord  
Power Transformer: T1  
Fuses: F401, 402

#### (b) Power Switch P.C.B. Ass'y

Power Switch: SW1  
Spark Killer: M2

#### (c) Tape Switch P.C.B. Ass'y

Power Transistor: Q301  
Fail Safe Type Resistor: R318, 350

#### (d) Main P.C.B. Ass'y

Regulator IC: IC402  
Power Transistors: Q601, 607, 620, 624  
Diode Bridge: D401  
Fail Safe Type Resistors: R320, 342, 403, 406, 612, 631  
Thermal Fuse: TF1

### 7.2. IC Block Diagrams

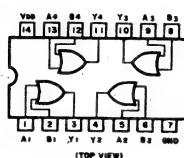


Fig. 7.2.1. OR Gate C-MOS IC  $\mu$ PD4071BC

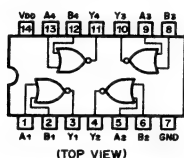


Fig. 7.2.2. NAND Gate C-MOS IC  $\mu$ PD4011BC

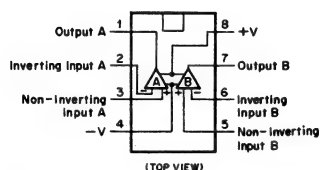


Fig. 7.2.3. Operational Amp. IC4558DD, 4556D, NJM4558D, NJM2043DD

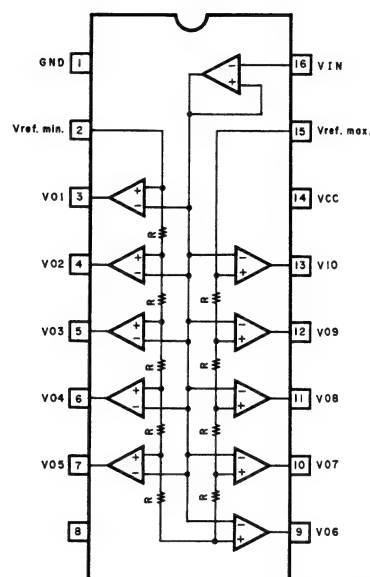


Fig. 7.2.4. Level Meter Driver TA7612AP



### 7.3. Schematic Diagram

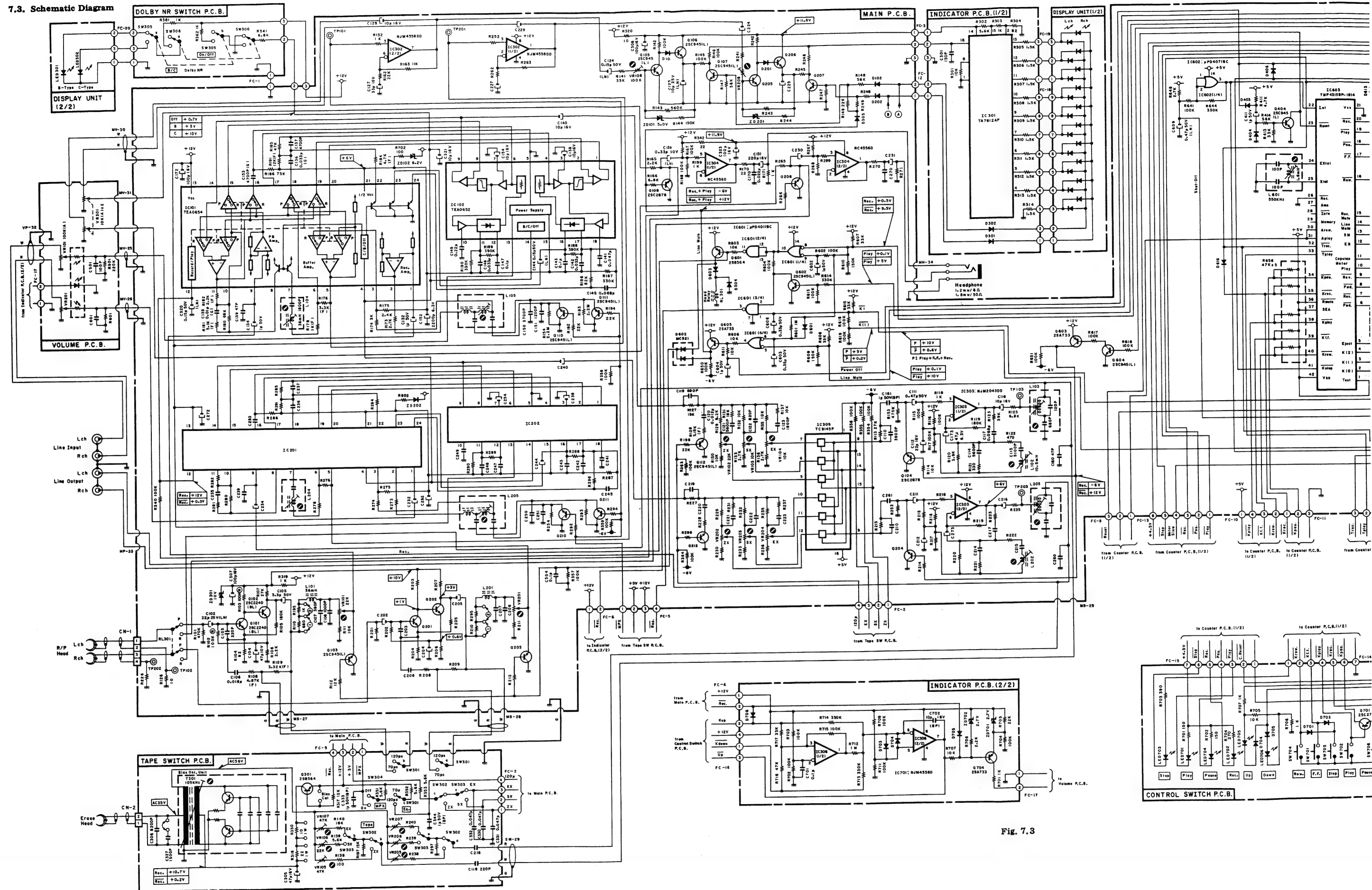
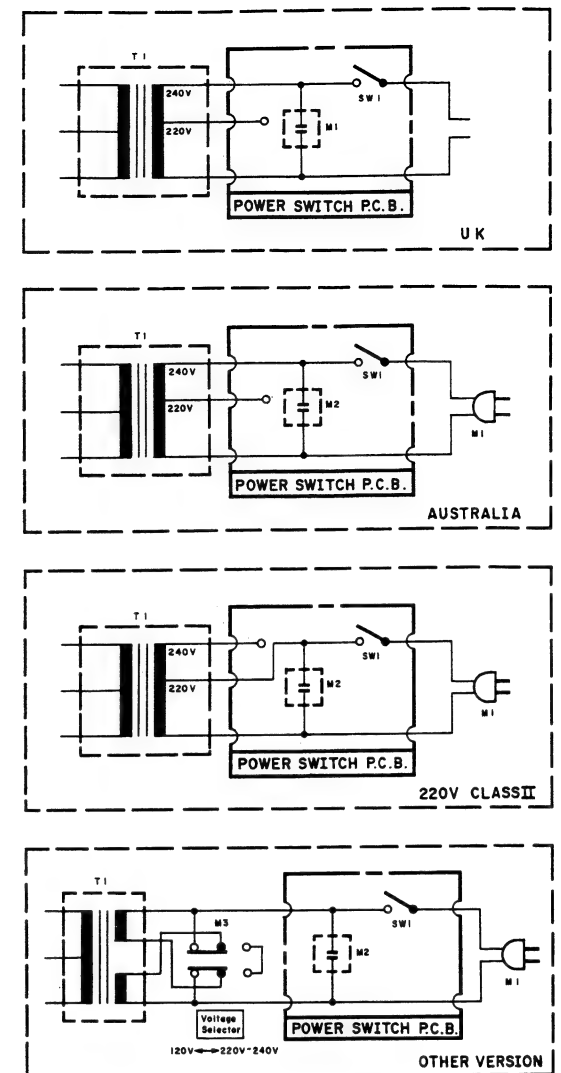
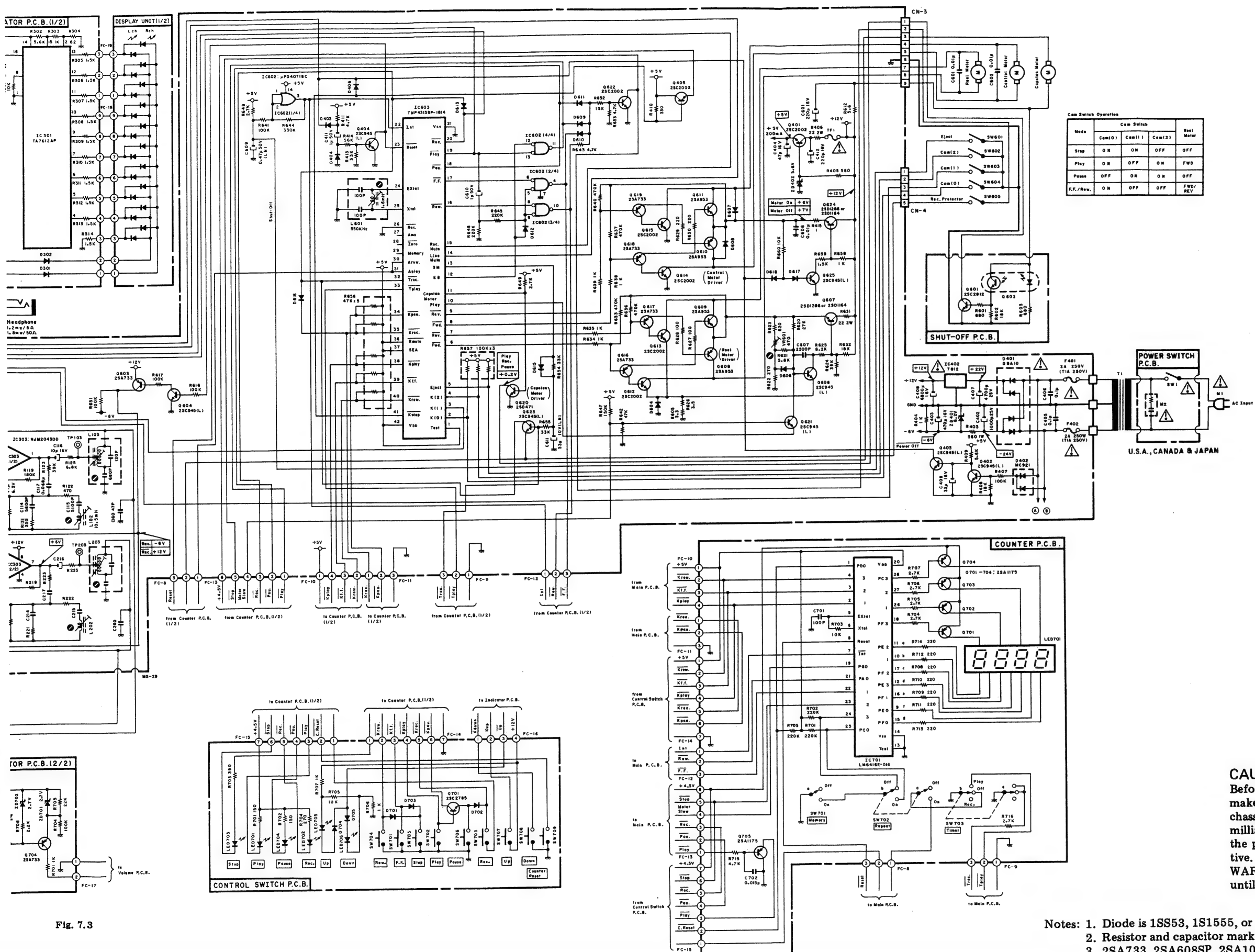


Fig. 7.3





**CAUTION:**  
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective.  
**WARNING — DO NOT** return the unit to the customer until the problem is located and corrected.

- Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.  
2. Resistor and capacitor marked with \* show typical value.  
3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.  
4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

Fig. 7.3

8. WIRING DIAGRAM

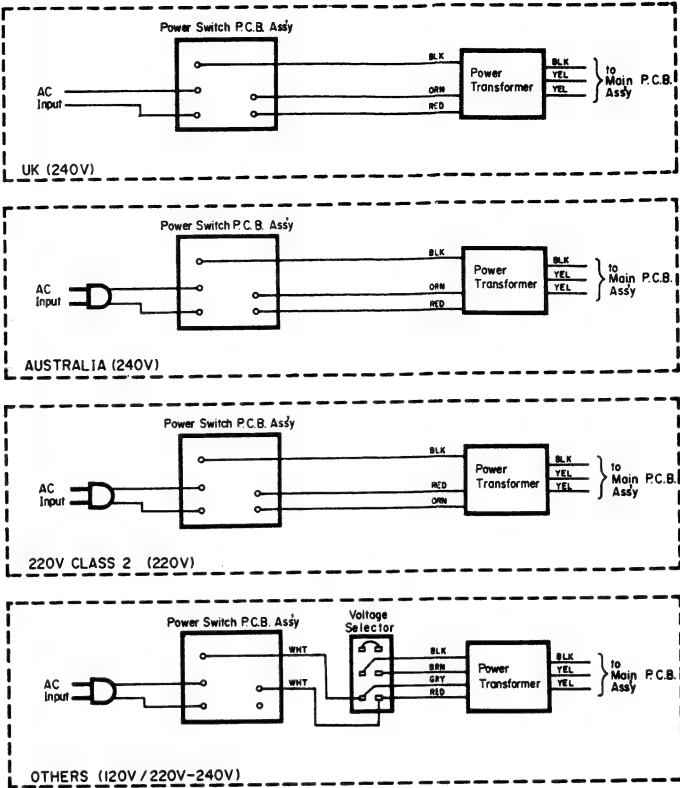
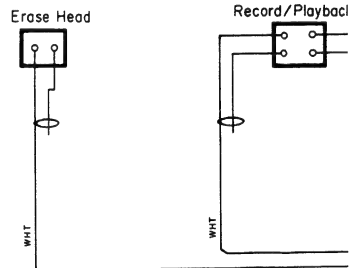
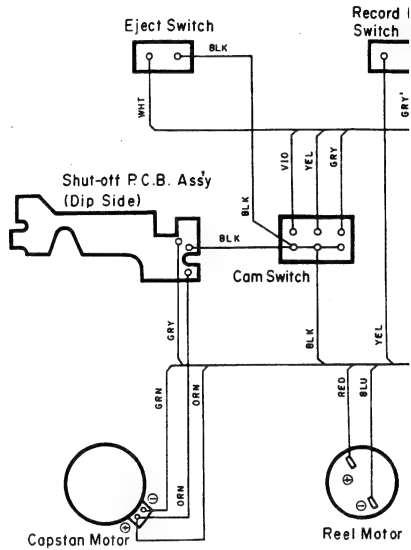
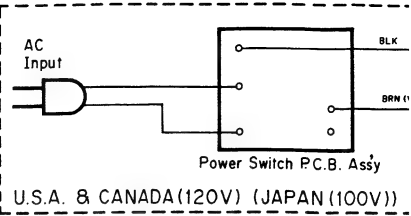


Fig. 8.1



- Notes: 1. Table of wire colors
- |              |              |
|--------------|--------------|
| BRN — Brown  | BLU — Blue   |
| RED — Red    | VIO — Violet |
| ORN — Orange | GRY — Gray   |
| YEL — Yellow | WHT — White  |
| GRN — Green  | BLK — Black  |
2. Component side view of the P.C.B. is illustrated unless otherwise specified.

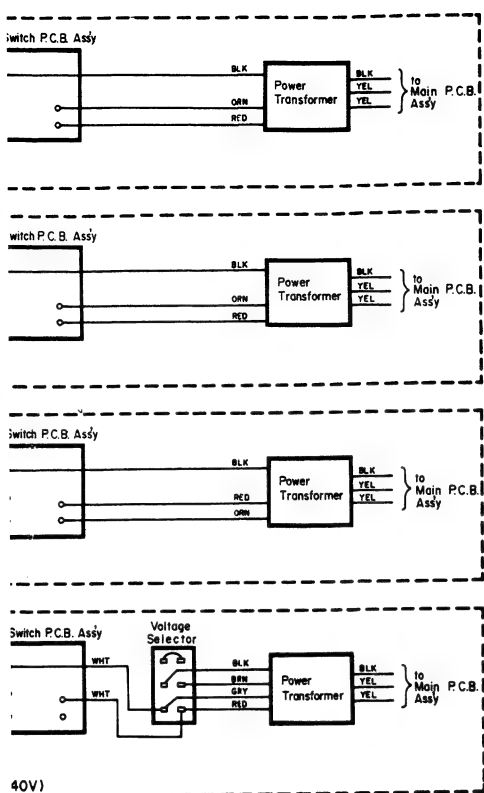


Fig. 8.1

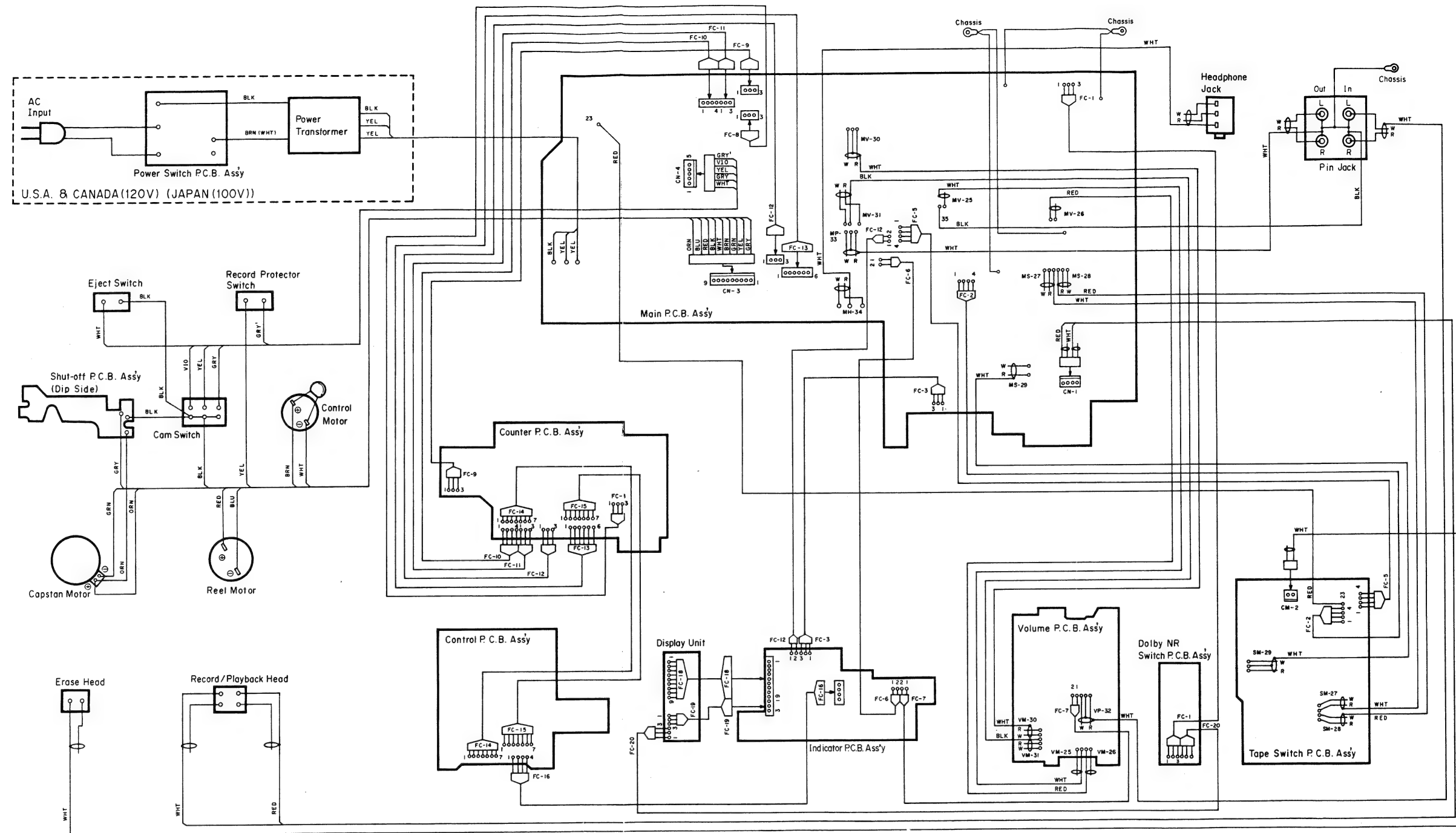


Fig. 8.2.1 2nd Version

wire colors

- Brown BLU — Blue
- Red VIO — Violet
- Orange GRY — Gray
- Yellow WHT — White
- Green BLK — Black

ent side view of the P.C.B. is illustrated unless otherwise specified.



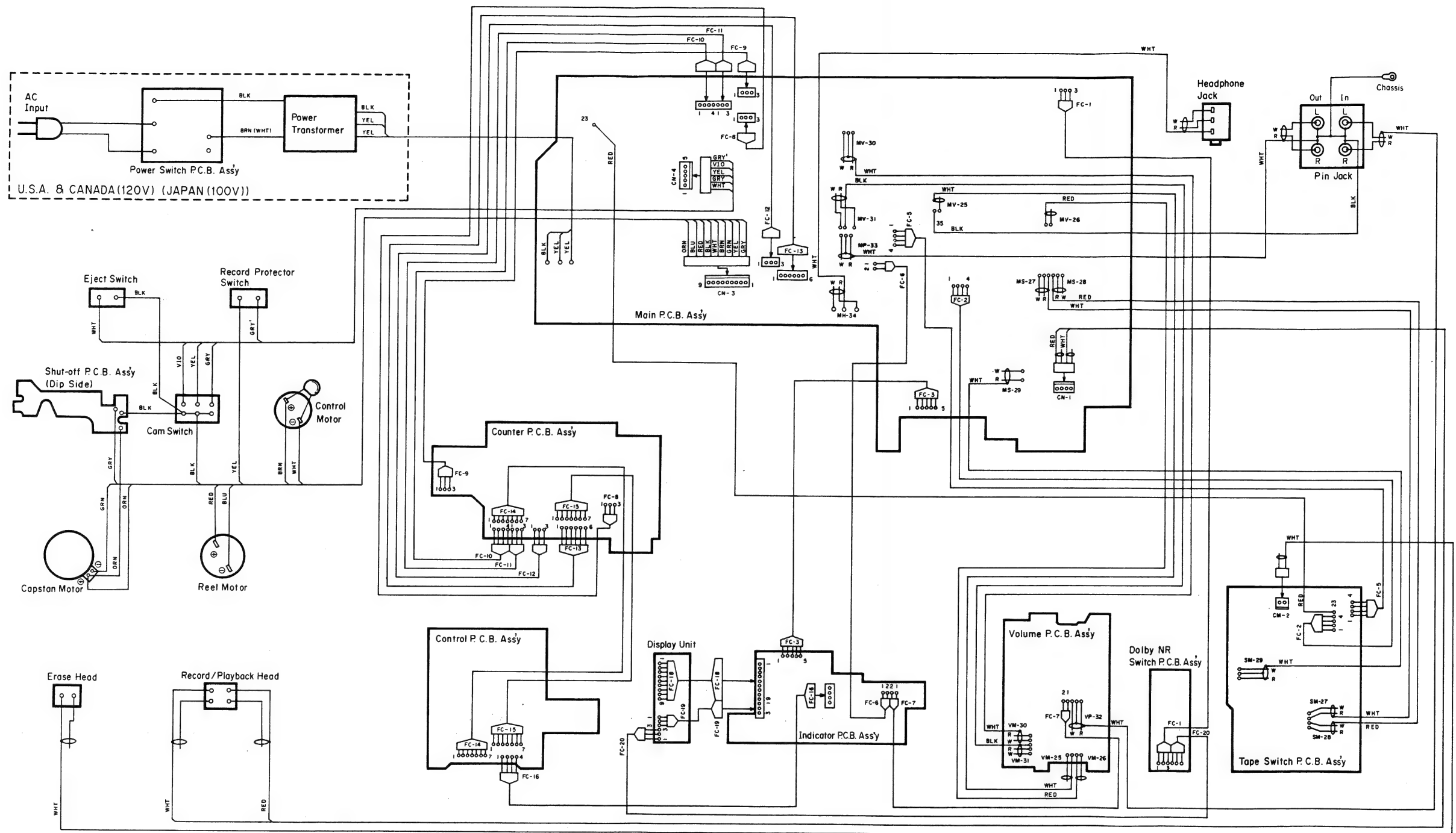


Fig. 8.2.2 1st Version

## 9. BLOCK DIAGRAMS

### 9.1. Amplifier Section

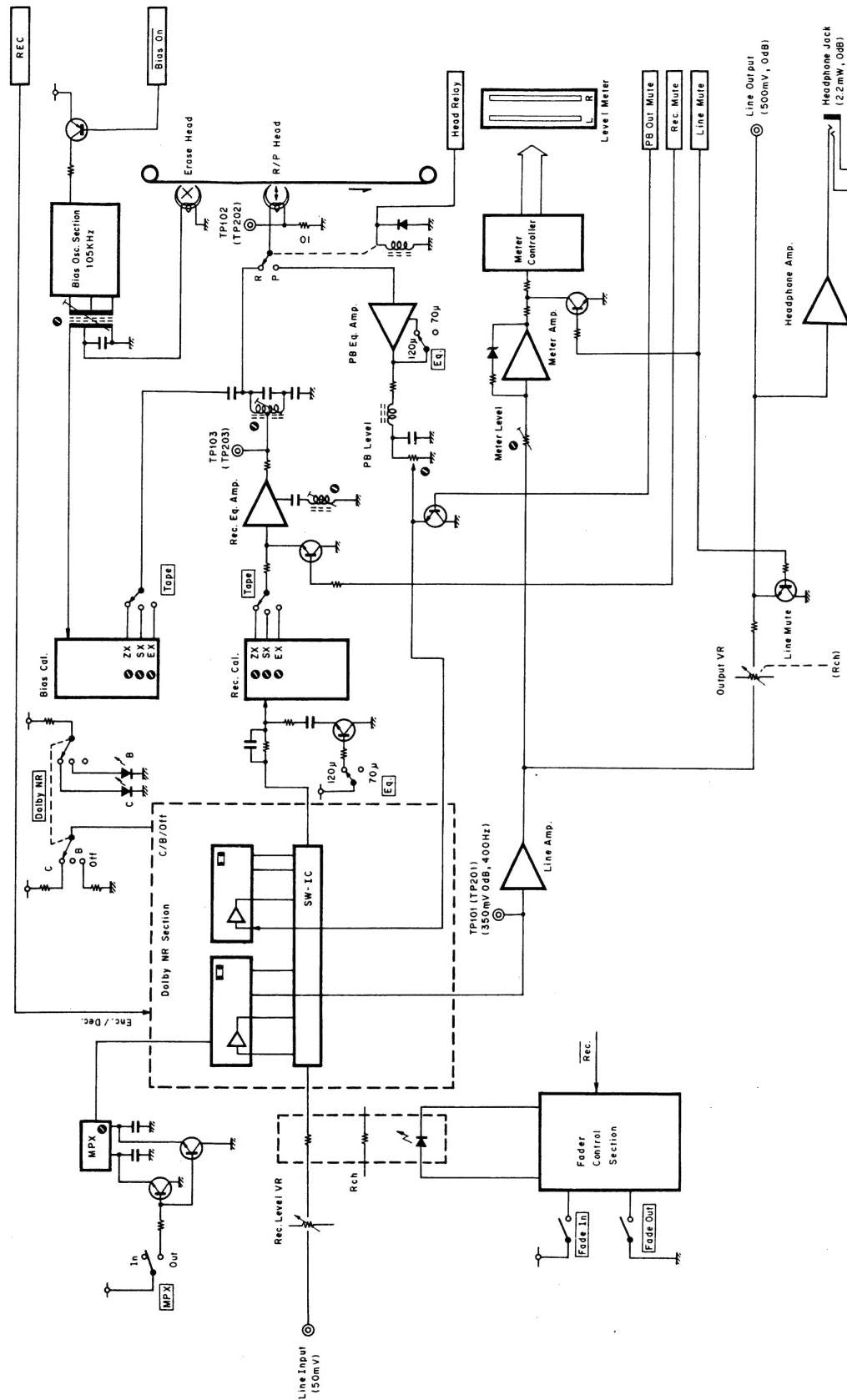


Fig. 9.1

### 9.2. Mechanism Control Section

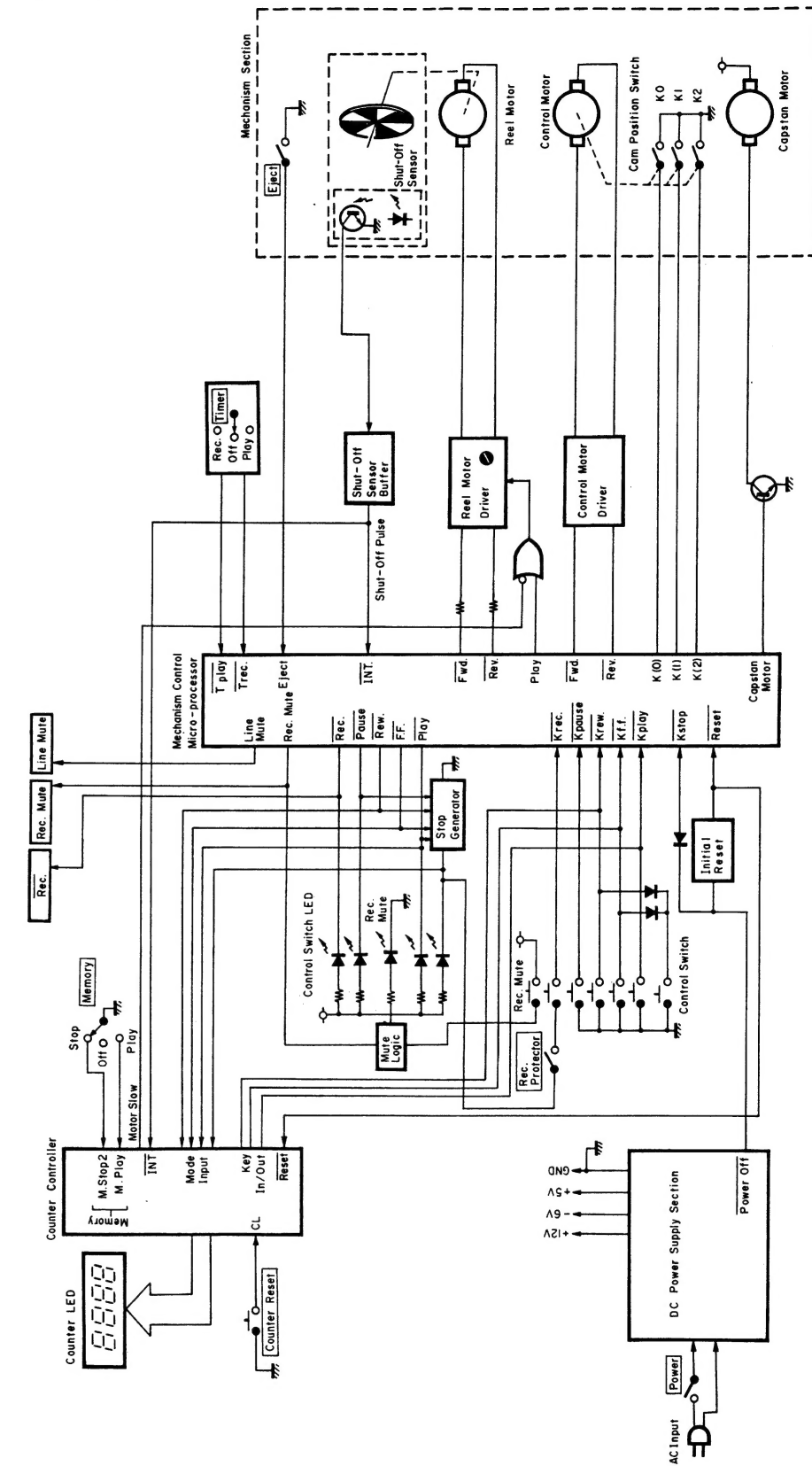


Fig. 9.2

## 10. TIMING CHART AND EQ. AMP. FREQUENCY RESPONSE

### 10.1. Timing Chart

#### (1) Overall Timing Chart

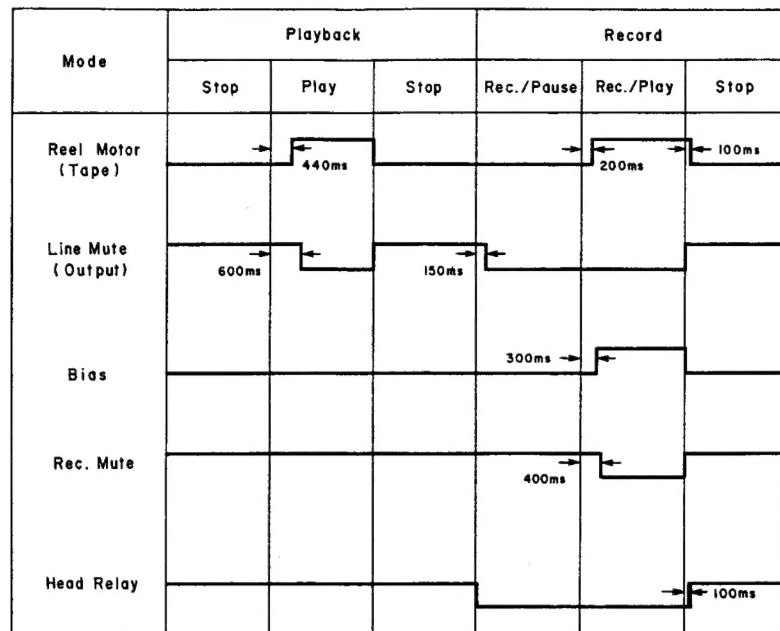


Fig. 10.1.1

#### (2) Mechanism Control Timing Chart

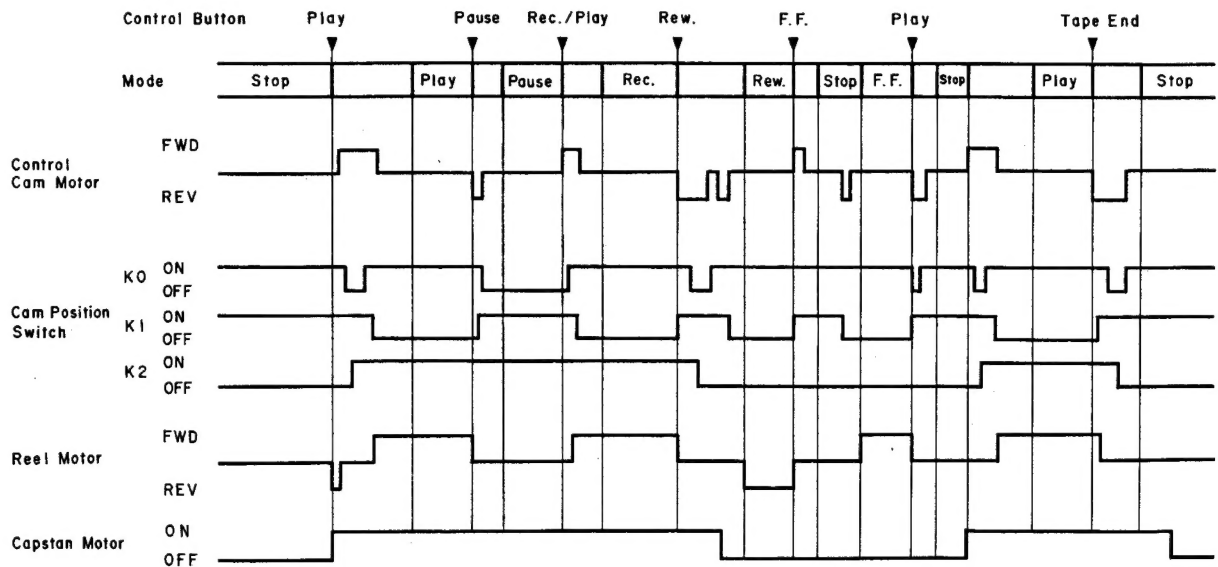


Fig. 10.1.2

**10.2. Eq. Amp. Frequency Response**  
**(1) Playback Frequency Response**

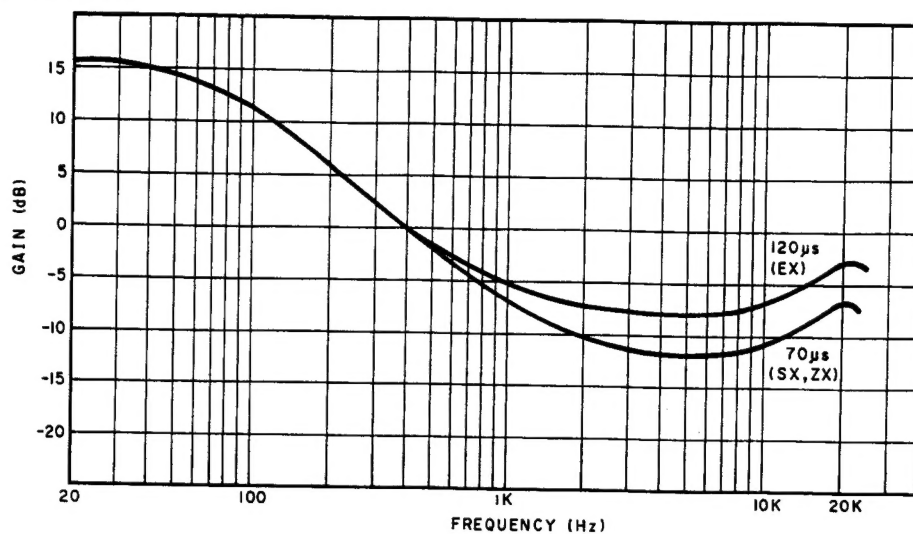


Fig. 10.2.1

**(2) Record Current Frequency Response**

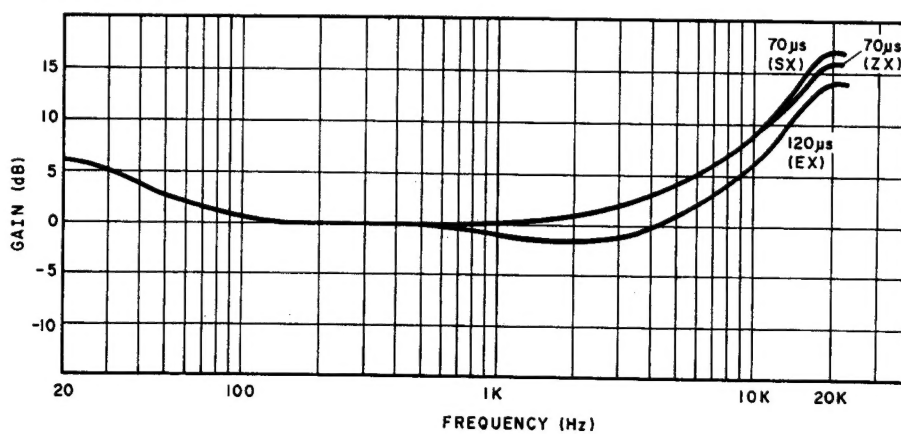


Fig. 10.2.2

## 11. SPECIFICATIONS

Track Configuration	4 Tracks/2-Channel Stereo
Heads	2 (Erase Head x 1, Record/Playback Head x 1)
Motors (Tape Transport)	DC Servo Motor (Capstan Drive) x 1 DC Motor (Reel Drive) x 1
Power Source	100, 120, 120/220-240, 220 or 240V AC; 50/60 Hz (According to country of sale)
Power Consumption	23 W max.
Tape Speed	1-7/8 ips. (4.8 cm/sec.) $\pm 0.5\%$
Wow-and-Flutter	Less than 0.11% WTD Peak Less than 0.06% WTD RMS
Frequency Response	20 Hz–20,000 Hz (recording level –20 dB)
Signal-to-Noise Ratio	Dolby C-Type NR on <70 $\mu$ s, ZX tape> Better than 68 dB (400 Hz, 3% THD, IHF A-WTD RMS) Dolby B-Type NR on <70 $\mu$ s, ZX tape> Better than 62 dB (400 Hz, 3% THD, IHF A-WTD RMS)
Total Harmonic Distortion	Less than 1.0% (400 Hz, 0 dB, ZX, EXII tape) Less than 1.2% (400 Hz, 0 dB, SX tape)
Erasure	Better than 60 dB (100 Hz, 0 dB)
Separation	Better than 36 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV, 30 k $\Omega$
Output (Line)	0.5 V (400 Hz, 0 dB, output level control at max.) 2.2 k $\Omega$
(Headphones)	2.2 mW (400 Hz, 0 dB, output level control at max.) 8 $\Omega$ load
Fast-Winding Time	Approx. 85 seconds (with C-60 cassette)
Dimensions	430 (W) x 110 (H) x 250 (D) millimeters 16-15/16 (W) x 4-5/16 (H) x 9-7/8 (D) inches
Approximate Weight	5.5 kg 12 lb. 2 oz

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